ANACONDA SMELTER NPL SITE
COMMUNITY SOILS OPERABLE UNIT

Draft Final

West Valley Railroad Bed Investigation
Data Summary Report (DSR)

Atlantic Richfield Company

August 15, 2003

Atlantic Richfield Company

OVERNIGHT MAILED – CERTIFIED RETURN RECEIPT

317 Anaconda Road
Butte, Montana 59701
Office 406 782-9964
Fax 406 782-9980

August 20, 2003

Mr. Charlie Coleman
U.S. EPA, Region VIII
Montana Office
301 S. Park, Drawer 10096
Helena, MT 59626-0096

RE: Draft Final Anaconda Regional Water, Waste, and Soils (ARWW&S) Remedial Design Unit (RDU) 5 Anaconda Active Railroads Beds Remedial Action Work Plan/Final Design Report (RAWP/FDR) and Draft Final West Valley Railroad Bed Investigation Data Summary Report

Dear Charlie,

Attached, please find five copies of the aforementioned documents for your review and approval. The RAWP/FDR presents the railroad remedial design and action for the railroad line from the east end of the East Anaconda Yards to the Intersection with North Cable Road. The design incorporates Agency comments to the Draft Community Soils Railroad Beds RAWP/FDR dated October 31, 2000, and discussed between Atlantic Richfield and the Agencies on February 27, 2003. Additionally, the design includes removal of the West Valley line, utilizing recent data collection efforts (the attached DSR) on the West Valley line.

This submittal is one of two RAWP/FDRs for RDU 5. The second submittal forthcoming the week of August 29, 2003 is the ARWW&S Active Railroad/Blue Lagoon RDU 5 RAWP/FDR. If you have any questions or would like to set up a meeting to review this submittal, please contact me at 406-563-5211, ext. 453.

Sincerely,

Steve Ferry
ARWW&S Project Manager

Cc: Bill Botsford/DEQ (two copies – certified return receipt)
Thomas Root E. Root/DEQ (one copy – certified return receipt)
Andrew Lensink, Esq./EPA (one copy – certified return receipt)
Gunnar Emilsson/CDM
Ken Brochman/BOR
Dave Smith/BNSF
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Atlantic Richfield:

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Jack Marjerison/Atlantic Richfield (w/o enc.)
Debbie Tesdal/Atlantic Richfield (w/o enc.)
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Tim Hilmo/Pioneer
Doug Graves/TREC
Mike McLeod/ DJ&A (DSR only)
Shawn Bisch/Pioneer

File: 72.04.110.1 (RDU5)
Chron. (w/o enc.)
Library

ANACONDA SMELTER NPL SITE
COMMUNITY SOILS OPERABLE UNIT

Draft Final

West Valley Railroad Bed Investigation
Data Summary Report (DSR)

Prepared for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Prepared by:

Pioneer Technical Services, Inc.
P. O. Box 3445
Butte, Montana 59702

August 15, 2003

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ABBREVIATIONS AND ACRONYMS

ARWW&S	Anaconda Regional Water, Waste, and Soils
CFRSSI	Clark Fork River Superfund Site Investigations
CLP	Contract Laboratory Program
DM/DV	Data Management/Data Validation
DQA	Data Quality Assessment
DQO	Data Quality Objective
DSR	Data Summary Report
EPA	U.S. Environmental Protection Agency
mg/kg	milligrams per kilogram
NPL	National Priorities List
OU	Operable Unit
Pioneer	Pioneer Technical Services, Inc.
QA/QC	Quality Assurance/Quality Control
RA	Remedial Action
RDU	Remedial Design Unit
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SOP	Standard Operating Procedure
SOW	Scope of Work
XRF	X-Ray Fluorescence

ABSTRACT

This Remedial Design Unit (RDU) 5 West Valley Railroad Bed Investigation Data Summary Report (DSR) for the Anaconda Regional Water, Waste, and Soils (ARWW&S) Operable Unit (OU) of the Anaconda Smelter National Priorities List (NPL) Site presents the soil sampling results for the West Valley portion of the RDU 5 railroad. The investigation was conducted according to the approved *Draft Final RDU 5 West Valley Railroad Bed Investigation Sampling and Analysis Plan (SAP)* (Atlantic Richfield Company, 2003). Data presented in this DSR will be used to further characterize the extent of arsenic contamination within the West Valley Railroad Bed and determine the appropriate Remedial Action (RA).

This DSR was prepared by Pioneer Technical Services, Inc. (Pioneer) P.O. Box 3445, Butte, Montana 59702 for:

Atlantic Richfield Company
317 Anaconda Road
Butte, Montana 59701

Data presented in this DSR include the soil lithologies and soil sample results collected along the West Valley portion of the RDU 5 railroad.

STATEMENT OF AUTHENTICITY

Consistent with the provisions described in the 1998 U. S. Environmental Protection Agency (EPA) *Record of Decision* (ROD) for the ARWW&S OU of the Anaconda Smelter NPL Site, the following data sets are considered to be final data generated or evaluated for this investigation. The signatures below hereby stipulate to the authenticity and accuracy of the data and hereby waive any evidentiary or other objection as to the authenticity and accuracy of reference in identifying RAs.

Approved by: _____ _____

Steve Ferry Date
Project Manager
Atlantic Richfield Company

Approved by: _____ _____

Charles Coleman Date
U.S. Environmental Protection Agency
Region VIII

Approved by: _____ _____

Brian Bartkowiak Date
Project Manager
Montana Department of Environmental Quality

EXECUTIVE SUMMARY

This DSR summarizes the results for soil samples collected during the RDU 5 West Valley Railroad Bed Investigation. Data contained in this report were gathered following objectives and procedures documented in the approved *Draft Final RDU 5 West Valley Railroad Bed Investigation Sampling and Analysis Plan* (SAP) (Atlantic Richfield Company, 2003). Data presented in this DSR will be used to further characterize the extent of arsenic contamination within the West Valley Railroad Bed and determine the appropriate RA.

Test pits were excavated through the railroad bed and were used to obtain the soil samples to determine the concentration of arsenic through the profile of the railroad grade. A backhoe was used to complete the test pits within the existing West Valley railroad. Test pits were excavated near the outside edges of the ties to obtain the required soil lithologies, depth information and to collect soil samples at specific depth intervals. Soil samples were collected at 0 to 2 inches, 2 to 6 inches, 6 to 18 inches, and 18 to 24 inches or as modified as necessary while sampling. Composite samples were collected from the specific depth intervals from three test pits evenly spaced along the railroad bed. Each composite sample represented approximately 1,500 feet of the railroad bed.

Laboratory analysis was competed using the EPA's *Contract Laboratory Program (CLP) Scope of Work (SOW) 7/88* (EPA, 1988) protocols. A summary of the analytic results is provided on Table 1 with enforcement/screening assessments, and Level A/B assessment. Laboratory assigned flags and qualifiers as defined in the *Clark Fork River Superfund Site Investigation (CFRSSI) Data Management/Data Validation (DM/DV) Plan* (ARCO, 1992a); *Addenda to the Clark Fork River Superfund Site Investigation (CFRSSI) Data Management/Data Validation* (DM/DV) *Plan* (EPA, 2000a); and *Clark Fork River Superfund Site Investigation (CFRSSI) Pilot Data Report Addendum* (EPA, 2000b) are provided on Table 1.

All samples were analyzed by X-Ray Fluorescence (XRF) Spectroscopy for total arsenic. A Quality Assurance/Quality Control (QA/QC) review of all analytical data collected during the RDU 5 West Valley Railroad Bed Investigation is provided in Appendix A.

1.0 INTRODUCTION

This DSR presents the results of the RDU 5 West Valley Railroad Bed Investigation within the ARWW&S OU. The information contained in this DSR was gathered following objectives and procedures documented in the *Draft Final RDU 5 West Valley Railroad Bed Investigation Sampling and Analysis Plan* (SAP) (Atlantic Richfield Company, 2003), provided in Appendix B.

The following information is included in this DSR:

- Objectives of the investigation;
- Locations of all sampling sites;
- A description of field data and sample collection;
- Field documentation;
- Analytical results; and
- Data validation/data usability analysis.

The original field logbook for this investigation is located at the Pioneer office in Butte, Montana. Copies of the field logbook are located in Appendix C.

1.1 Investigation Objectives

The primary objectives of the RDU 5 West Valley Railroad Bed Investigation, as outlined in the SAP (Atlantic Richfield Company, 2003), were to further characterize the extent of arsenic contamination within the West Valley Railroad Bed. Surface sampling (0 to 2-inch depth interval) was conducted on the railroad beds in the fall of 1997 and spring of 1998; sampling results are presented in the *Anaconda Residential Soils, Regional Soils, and Railroad Areas Data Interpretive Report* (AERL, 1999). Arsenic concentrations in the surface samples collected from the West Valley Railroad Bed generally exceeded 1,000 milligrams per kilogram (mg/kg). The purpose of the 2003 sampling effort was to refine the depth and extent of the arsenic contamination present in the railroad bed embankment.

1.2 Data Quality Objectives and Assessment

The Data Quality Objectives (DQOs) of the RDU 5 West Valley Railroad Bed Investigation, as outlined in the SAP (Atlantic Richfield Company, 2003), were as follows:

- Laboratory requirements for sample analysis were to be completed using the EPA's CLP protocols (EPA, 1988).

- Field QA/QC was to be consistent with *CFRSSI Standard Operating Procedure (SOP) G-6* (ARCO, 1992b) and was to include 1 field duplicate and 1 field blank for every 20 primary samples.

Results of the Data Quality Assessment (DQA) include:

- All laboratory detection limits, accuracy, and precision requirements were performed in accordance with the EPA's CLP protocols (EPA, 1988).

- Duplicate samples and field blanks were collected at a frequency of approximately 1 per 20 primary samples, meeting the field QA/QC DQOs of 1 per 20 primary samples.

- As a result of the data validation and Level A/B QA/QC review (Appendix A), 100% of the data collected during the RDU 5 West Valley Railroad Bed Investigation were determined to be enforcement quality; therefore, meeting the DQOs.

Composite samples were collected from specific depth intervals from three test pits evenly spaced along the railroad bed. Test pits were spaced 500 lineal feet from each other on alternating sides of the tracks and ties (see Figures 1 and 2); therefore, each composite sample represented a 1,500-foot section of railroad bed. Sixty-two samples were proposed in the SAP (Atlantic Richfield Company, 2003). Eighty samples were collected during the investigation including the proposed 62 samples, opportunity samples, and additional samples that were used to characterize the west end of the West Valley Railroad Bed.

1.3 Investigation Site Description

The western extent of the RDU 5 West Valley Railroad Bed Investigation area corresponds with the intersection of the railroad bed with North Cable Road approximately 4 miles west of the community of Anaconda, Montana. The eastern extent of the RDU 5 West Valley Railroad Bed Investigation area corresponds with the intersection of the railroad bed with Pennsylvania Avenue located immediately west of the West Anaconda Yards (see Figure 2B of the SAP [Atlantic Richfield Company, 2003]). The West Valley Railroad Bed is currently an Active Railroad bed; rails and ties remain in-place. This railroad bed includes 1 crossing of Warm Springs Creek, where the creek intersects the railroad grade approximately 0.3 miles west of Anaconda. The RDU 5 West Valley Railroad Bed is generally characterized by contaminated ballast associated directly with the railroad grade.

1.4 Sampling and Analysis Summary

A backhoe was used to excavate test pits through the railroad bed. Test pits were excavated near the outside edges of the ties to obtain the required soil lithologies, depth information (depth-to-native soils) and to collect soil samples at specific depth intervals (0 to 2 inches, 2 to 6 inches, 6 to 18 inches, and 18 to 24 inches, or as modified as necessary while sampling). Composite samples were collected from specific intervals from 3 test pits evenly spaced along the railroad bed. The test pits were spaced 500 lineal from each other on alternating sides of the tracks and ties (see Figures 1 and 2); therefore, each composite sample represented a 1,500-foot section of the railroad bed. Table 2 provides the test pit location coordinates.

The test pit face was scraped to reveal fresh, non-smeared surfaces and the samples were collected at the specific interval using a clean disposable scoop. The composite was thoroughly mixed in a new disposable aluminum container. During the homogenization process, large particles (>0.5-inch diameter) were discarded. The composite sample was placed in a clean, labeled sample container.

Seventy-three soil samples, 4 duplicate samples, and 4 blank samples were collected and analyzed during the RDU 5 West Valley Railroad Bed Investigation. Samples were collected and analyzed following procedures detailed in the SAP (Atlantic Richfield Company, 2003), except where noted as a deviation from the SAP in Section 3.0. All soil samples were collected from backhoe test pits. Using XRF Spectroscopy, samples were analyzed for total arsenic by Ashe Analytics, of Butte, Montana. Laboratory data results and qualifiers are provided in Appendix D.

Thirty-nine of the 80 samples exceeded the open space/recreational arsenic action level of 1,000 mg/kg as set forth in the ARWW&S OU ROD (EPA, 1998). The sample results are summarized on Table 1. Figures 1 and 2 identify the arsenic concentrations at each depth interval for each composite.

2.0 PREVIOUS INVESTIGATION

The following is a list of documents prepared for investigations and response actions that have been performed on or in the vicinity of RDU 5:

- AERL, 1997. Anaconda Smelter NPL Site, Community Soils Operable Unit. *Remedial Design Sampling and Analysis Plan, RR Beds, Yards and Adjacent Areas.* September 1997.

- AERL, 1999. *Anaconda Residential Soils, Regional Soils, and Railroad Areas Data Interpretive Report.*

- Advisory Council on Historic Preservation, Second Programmatic Agreement, 1994. Memorandum of Agreement Regarding Implementation if the CERCLA Related Elements of the Upper Clark Fork River Basin Regional Historic Preservation Plan. December 1994.

- ARCO, 1997. Anaconda Regional Water, Waste, and Soils Operable Unit: Revised *Conceptual Model of Fate & Transport, Pathway Assessment, and Areas and/or Media of Concern.* Prepared for AERL. February 1997.

- Camp, Dresser, McKee, (CDM) Inc., 1987. Final Data Report for Solid Matrix Screening Study, Anaconda Smelter Site, Anaconda, Montana, *Performance of Remedial Response Activities of Uncontrolled Hazardous Waste Sites.* Prepared for U.S. Environmental Protection Agency 1987.

- CDM Federal Programs Corp., 1996. *Final Baseline Human Health Risk Assessment*, Anaconda Smelter NPL Site. January 1996.

- EPA, 1996. Final Feasibility Study, Deliverable No. 3B for Anaconda Regional Water, Waste and Soils Unit (*Identification of Problem Statement, Remediation Goals and Objectives, Waste Removal Evaluation, Development of Alternatives, Alternative Selection for Each Subarea*). Prepared for U.S. Environmental Protection Agency. October 24, 1996.

- Pioneer, 2000. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit *Dedicated Development Plan.* Prepared for AERL. August 2000.

- PTI Environmental Services, 1992. *Anaconda Soil Investigation Data Summary/Data Validation/Data Usability Report.* March 1992.

- PTI Environmental Services, 1993. *Anaconda Soil Investigation Phase II Data Summary/Data Validation/Data Usability.* January 1993.

- Titan Environmental Corp., 1996. *Conceptual Model of Contaminant Fate and Transport, Pathway Assessment, and Areas and/or Media of Concern.* Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit. Prepared for AERL.

3.0 DEVIATIONS FROM THE SAMPLING AND ANALYSIS PLAN

The following SAP (Atlantic Richfield Company, 2003) deviations were noted during the RDU 5 West Valley Railroad Bed Investigation:

- Thirteen samples, which are listed below, were collected to characterize the west end of the West Valley Railroad Bed. This area was not originally covered in the SAP (Atlantic Richfield Company, 2003).

    - WVRB-WE-0;
    - WVRB-WE-2;
    - WVRB-WE-8; and
    - WVRB-WE-NG.

The following samples were proposed in the SAP (Atlantic Richfield Company, 2003) as composite samples; however, the samples were collected as discrete samples.

- WVRB-WE-C-0;
- WVRB-WE-C-2;
- WVRB-WE-C-8;
- WVRB-WE-C-NG;
- WVRB-WE-D-0;
- WVRB-WE-D-2;
- WVRB-WE-D-8;
- WVRB-WE-D-NG; and
- WVRB-WE-D-12.

These deviations did not affect the SAP (Atlantic Richfield Company, 2003) objectives.

4.0 REFERENCES

Advisory Council on Historic Preservation, Second Programmatic Agreement, 1994. Memorandum of Agreement Regarding Implementation if the CERCLA Related Elements of the Upper Clark Fork River Basin Regional Historic Preservation Plan. December 1994.

AERL, 1997. Anaconda Smelter NPL Site, Community Soils Operable Unit. Remedial Design Sampling and Analysis Plan, RR Beds, Yards and Adjacent Areas. September 1997.

AERL, 1999. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit. Anaconda Residential Soils, Regional Soils, and Railroad Areas Data Interpretive Report.

ARCO, 1992a. Clark Fork River Superfund Site Investigations Data Management/Data Validation (DV/DV) Plan.

ARCO, 1992b. Clark Fork River Superfund Site Investigations Standard Operating Procedures (SOPs). September 1992.

ARCO, 1997. Anaconda Regional Water, Waste, and Soils Operable Unit: Revised Conceptual Model of Fate & Transport, Pathway Assessment, and Areas and/or Media of Concern. Prepared for AERL. February 1997.

Atlantic Richfield Company, 2003. Anaconda Smelter NPL Sit, Anaconda Regional Water, Waste, and Soils Operable Unit Draft Final RDU 5 West Valley Railroad Bed Investigation Sampling and Analysis Plan (SAP). July 2003.

Camp, Dresser, McKee, (CDM) Inc., 1987. Final Data Report for Solid Matrix Screening Study, Anaconda Smelter Site, Anaconda, Montana, Performance of Remedial Response Activities of Uncontrolled Hazardous Waste Sites. Prepared for U.S. Environmental Protection Agency 1987.

CDM Federal Programs Corp., 1996. Final Baseline Human Health Risk Assessment, Anaconda Smelter NPL Site. January 1996.

EPA, 1988. U.S. Environmental Protection Agency's Contract Laboratory Program (CLP) Scope of Work (SOW) 7/88 Protocols.

EPA, 1996. Final Feasibility Study, Deliverable No. 3B for Anaconda Regional Water, Waste and Soils Unit (Identification of Problem Statement, Remediation Goals and Objectives, Waste Removal Evaluation, Development of Alternatives, Alternative Selection for Each Subarea). Prepared for U.S. Environmental Protection Agency. October 24, 1996.

EPA, 1998. Anaconda Regional Water, Waste and Soils Operable Unit Record of Decision. September 1998.

EPA, 2000a. Addenda to the Clark Fork River Superfund Site Investigation Data Management/Data Validation (DM/DV) Plan.

EPA, 2000b. Addenda to Clark Fork River Superfund Site Investigations Pilot Data Report. February 2000.

Pioneer, 2000. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit Dedicated Development Plan. Prepared for AERL. August 2000.

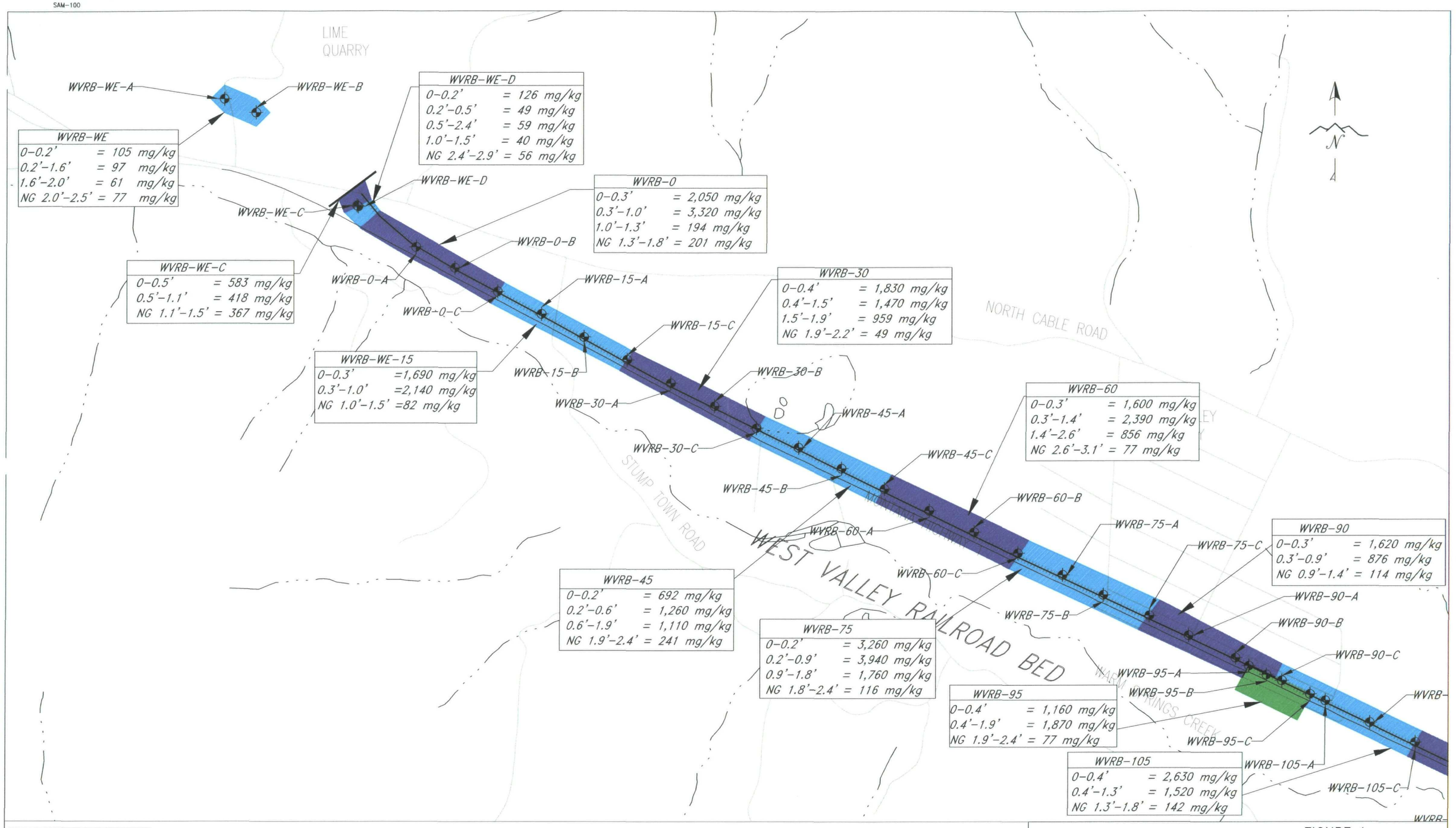
PTI Environmental Services, 1992. Anaconda Soil Investigation Data Summary/Data Validation/Data Usability Report. March 1992.

PTI Environmental Services, 1993. Anaconda Soil Investigation Phase II Data Summary/Data Validation/Data Usability. January 1993.

Titan Environmental Corp., 1996. Conceptual Model of Contaminant Fate and Transport, Pathway Assessment, and Areas and/or Media of Concern; Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit. Prepared for AERL.

FIGURES

SAM-100



WVRB-WE-15
0-0.3' = 1,690 mg/kg
0.3'-1.0' = 2,140 mg/kg
NG 1.0'-1.5' = 82 mg/kg

= COMPOSITE SAMPLE I.D. AND ARSENIC CONCENTRATION AT CORRESPONDING DEPTH INTERVAL

NG = NATIVE GROUND

◆ = TEST PIT LOCATION AND DISCRETE/SUBSAMPLE I.D.

PIONEER TECHNICAL SERVICES, INC.

FIGURE 1
WEST VALLEY
WEST SAMPLE LOCATIONS

SCALE: 1"=1000'
DATE: 8/8/03

SAM-101

WVRB-75-A
WVRB-75-C
WVRB-90-A
WVRB-90-B
WVRB-90-C
WVRB-95-A
WVRB-95-B
WVRB-95-C
WVRB-105-A
WVRB-105-B
WVRB-105-C
WVRB-120-A
WVRB-120-B
WVRB-120-C
WVRB-135-A
WVRB-135-B
WVRB-135-C
WVRB-150-A
WVRB-150-B
WVRB-150-C
WVRB-165-A
WVRB-165-B
WVRB-165-C
WVRB-180-A
WVRB-180-B
WVRB-180-C
WVRB-195-A
WVRB-195-B
WVRB-195-C
WVRB-210-A
WVRB-210-B

WVRB-105
0-0.4' = 2,630 mg/kg
0.4'-1.3' = 1,520 mg/kg
NG 1.3'-1.8' = 142 mg/kg

WVRB-135
0-0.2' = 3,570 mg/kg
0.2'-1.4' = 1,390 mg/kg
NG 1.4'-1.9' = 196 mg/kg

WVRB-120
0-0.3' = 2,770 mg/kg
0.3'-1.2' = 1,980 mg/kg
NG 1.2'-1.7' = 96 mg/kg

WVRB-165
0-0.-0.3' = 2,070 mg/kg
0.3'-1.0' = 2,700 mg/kg
1.0'-1.6' = 1,060 mg/kg
NG 1.6'-2.1' = 27 mg/kg

WVRB-150
0-0.4' = 2,500 mg/kg
0.4'-1.3' = 2,030 mg/kg
1.3'-2.1' = 462 mg/kg
NG 2.1'-2.6' = 97 mg/kg

WVRB-195
0-0.-0.5' = 1,410 mg/kg
0.5'-2.1' = 1,230 mg/kg
2.1'-2.6' = 39 mg/kg

WVRB-180
0-0.4' = 2,000 mg/kg
0.4'-1.5' = 1,620 mg/kg
NG 1.5'-2.0' = 28 mg/kg

WVRB-210
0-0.6' = 1,130 mg/kg
0.6'-1.0' = 1,600 mg/kg
1.0'-1.4' = 1,410 mg/kg
NG 1.4'-1.9' = 88 mg/kg

WARM SPRINGS CREEK
NORTH CABLE ROAD
WEST VALLEY RAILROAD BED
WARM SPRINGS CREEK
N

WVRB-120
0-0.3' = 2,770 mg/kg
0.3'-1.2' = 1,980 mg/kg
NG 1.2'-1.7' = 96 mg/kg

= COMPOSITE SAMPLE I.D. AND ARSENIC CONCENTRATION AT CORRESPONDING DEPTH INTERVAL

NG = NATIVE GROUND

⌖ = TEST PIT LOCATION AND DISCRETE/SUBSAMPLE I.D.

PIONEER TECHNICAL SERVICES, INC.

FIGURE 2
WEST VALLEY
EAST SAMPLE LOCATIONS

SCALE: 1"=1000'
DATE: 8/8/03

TABLES

Table 1. Data Summary with Enforcement and Screening Quality Assessment and Level A/B Assessment, Flags, and Qualifiers

Field ID	Sample Date	As Dis (mg/kg)	Stat	CFDMS Descriptor	Q	Validation Flag	Comment
WVRB-WE-0	7/28/2003	105	E				
WVRB-WE-2	7/28/2003	96.5	E				
WVRB-WE-8	7/28/2003	61	E				
WVRB-WE-NG	7/28/2003	76.5	E				
WVRB-WE-C-0	7/28/2003	583	E				discrete sample
WVRB-WE-C-2	7/28/2003	418	E				discrete sample
WVRB-WE-C-NG	7/28/2003	367	E				discrete sample
WVRB-WE-D-0	7/28/2003	126	E				discrete sample
WVRB-WE-D-2	7/28/2003	49.2	E				discrete sample
WVRB-WE-D-8	7/28/2003	58.8	E				discrete sample
WVRB-WE-D-NG	7/28/2003	55.8	E				discrete sample
WVRB-WE-0-12	7/28/2003	401	E				Opportunistic Sample
WVRB-0-0	7/28/2003	2050	E				
WVRB-0-2	7/28/2003	3320	E				
WVRB-0-8	7/28/2003	194	E				
WVRB-0-NG	7/28/2003	201	E				
WVRB-15-0	7/28/2003	1690	E				
WVRB-15-2	7/28/2003	2140	E				
WVRB-15-NG	7/28/2003	82.4	E				
WVRB-30-0	7/28/2003	1830	E				
WVRB-30-2	7/28/2003	1470	E				
WVRB-40-8	7/28/2003	959	E				
WVRB-30-NG	7/28/2003	48.9	E				
WVRB-B-1	7/29/2003	8.6	E		U		Blank
WVRB-45-0	7/29/2003	692	E				
WVRB-45-2	7/29/2003	1260	E				
WVRB-45-8	7/29/2003	997	E				
WVRB-45-8D	7/29/2003	1110	E				Duplicate
WVRB-45-NG	7/29/2003	241	E				
WVRB-60-0	7/29/2003	1600	E				
WVRB-60-2	7/29/2003	2390	E				
WVRB-60-8	7/29/2003	856	E				
WVRB-60-NG	7/29/2003	76.8	E				
WVRB-75-0	7/29/2003	3260	E				
WVRB-75-2	7/29/2003	3940	E				
WVRB-75-8	7/29/2003	1760	E				
WVRB-75-NG	7/29/2003	116	E				
WVRB-90-0	7/29/2003	1620	E				
WVRB-90-2	7/29/2003	876	E				
WVRB-90-NG	7/29/2003	114	E				
WVRB-95-0	7/29/2003	1160	E				South RR bed
WVRB-95-0D	7/29/2003	1100	E				South RR bed
WVRB-95-2	7/29/2003	1870	E				South RR bed
WVRB-95-NG	7/29/2003	77	E				South RR bed
WVRB-105-0	7/30/2003	2630	E				
WVRB-105-2	7/30/2003	1520	E				
WVRB-105-NG	7/30/2003	142	E				
WVRB-120-0	7/30/2003	2770	E				
WVRB-120-2	7/30/2003	1980	E				
WVRB-120-NG	7/30/2003	96	E				
WVRB-135A-0	7/30/2003	4650	E				Opportunistic Sample
WVRB-135A-2	7/30/2003	1770	E				Opportunistic Sample
WVRB-135-0	7/30/2003	3570	E				
WVRB-135-2	7/30/2003	1390	E				
WVRB-135-NG	7/30/2003	196	E				
WVRB-150-0	7/30/2003	2500	E				
WVRB-150-2	7/30/2003	2030	E				
WVRB-150-8	7/30/2003	462	E				
WVRB-150-NG	7/30/2003	96.5	E				
WVRB-165-A-8	7/30/2003	466	E				Opportunistic Sample
WVRB-165-0	7/30/2003	2070	E				
WVRB-165-2	7/30/2003	2700	E				
WVRB-165-8	7/30/2003	1060	E				
WVRB-165-NG	7/30/2003	27.2	E				
WVRB-165-2D	7/31/2003	2560	E				Duplicate
WVRB-180-0	7/31/2003	2000	E				
WVRB-180-2	7/31/2003	1620	E				
WVRB-180-NG	7/31/2003	27.9	E				
WVRB-195-0	7/31/2003	1410	E				
WVRB-195-2	7/31/2003	1230	E				
WVRB-195-NG	7/31/2003	38.5	E				
WVRB-210-0	7/31/2003	1130	E				
WVRB-210-2	7/31/2003	1600	E				
WVRB-210-8	7/31/2003	1410	E				
WVRB-210-NG	7/31/2003	87.9	E				
WVRB-210-NGD	7/31/2003	81	E				Duplicate
WVRB-90A-0	7/31/2003	3490	E				Opportunistic Sample
WVRB-B-3	7/30/2003	8.6	E		U		Blank
WVRB-B-4	7/31/2003	8.6	E		U		Blank
WVRB-B-2	7/31/2003	8.6	E		U		Blank

Table 2. Coordinates for RDU 5 West Valley Railroad Bed Investigation Sample Locations

Field ID	Northing	Easting
WVRB-WE-A	719249.082	1065705.847
WVRB-WE-B	719099.998	1066059.036
WVRB-WE-C	718076.091	1067177.672
WVRB-WE-D	718065.763	1067191.809
WVRB-0-A	717619.028	1067834.592
WVRB-0-B	717392.703	1068265.514
WVRB-0-C	717132.180	1068743.944
WVRB-15-A	716884.669	1069226.026
WVRB-15-B	716629.711	1069699.760
WVRB-15-C	716380.175	1070179.650
WVRB-30-A	716121.951	1070660.446
WVRB-30-B	715869.702	1071146.177
WVRB-30-C	715628.352	1071615.901
WVRB-45-A	715412.559	1072081.648
WVRB-45-B	715184.096	1072558.875
WVRB-45-C	714956.925	1073036.396
WVRB-60-A	714718.755	1073530.195
WVRB-60-B	714481.057	1074029.326
WVRB-60-C	714250.182	1074516.308
WVRB-75-A	714012.884	1075010.225
WVRB-75-B	713793.006	1075461.928
WVRB-75-C	713565.039	1075976.060
WVRB-90-A	713346.940	1076412.024
WVRB-90-B	713100.766	1076932.872
WVRB-90-C	712848.869	1077449.334
WVRB-95-A	713012.417	1077082.065
WVRB-95-B	712913.336	1077279.185
WVRB-95-C	712699.485	1077759.286
WVRB-105-A	712627.246	1077929.242
WVRB-105-B	712386.472	1078424.209
WVRB-105-C	712168.557	1078930.830
WVRB-120-A	711909.278	1079433.361
WVRB-120-B	711664.003	1079959.012
WVRB-120-C	711413.805	1080470.089
WVRB-135-A	711171.495	1080990.346
WVRB-135-B	710922.363	1081512.413
WVRB-135-C	710683.959	1082018.423
WVRB-150-A	710442.771	1082514.724
WVRB-150-B	710211.068	183014.953
WVRB-150-C	709972.466	1083508.837
WVRB-165-A	709732.986	1084019.132
WVRB-165-B	709490.979	1084514.756
WVRB-165-C	709264.476	1085009.412
WVRB-180-A	709019.735	1085509.519
WVRB-180-B	708788.904	1086005.026
WVRB-180-C	708547.758	1086495.279
WVRB-195-A	708301.094	1086996.833
WVRB-195-B	708020.470	1087445.790
WVRB-195-B2	707996.440	1087494.622
WVRB-195-C	707696.739	1087874.975
WVRB-210-A	707352.219	1088260.265
WVRB-210-B	706959.743	1088638.199
WVRB-210-C	706564.064	1089023.366

APPENDIX A

QUALITY ASSURANCE/QUALITY CONTROL REVIEW

Appendix A

Quality Assurance and Quality Control Review of Inorganic Data for the West Valley Soils Operable Unit

Quality Assurance and Quality Control Review of Inorganic Data for the West Valley Soils Investigation

Summaries of the samples collected for this investigation are included in the attached tables. The analytical protocols used to obtain metals data during the West Valley Soils Investigation included XRF Spectrace ®. The quality of the inorganic data is summarized in the paragraphs below and in the report attachments.

Executive Summary

Enforcement quality data are supported by rigorous sampling and analysis procedures, quality assurance and quality control (QA/QC) protocols, and documentation requirements. Enforcement quality data include data that meet the Level A and B criteria (Attachment C) and are not qualified as estimated during the data validation process. In addition to the Level A/B assessment, the data are reviewed for qualifiers. Data that meet the Level A and B criteria and are free of qualifiers are assessed and enforcement quality.

Of the 80 total data points for inorganic data, none of the results for this investigation are rejected. The analytical data and the enforcement screening assessment are presented in Table 1 in the main text of the report. Sample number codes and sampling coordinates at each station are also identified in Table 1.

Of the 80 total data points, 100.0 percent of the data points are classified as enforcement quality data and are unqualified.

Quality Assurance and Quality Control Review of Inorganic Data

Data validation checklists were completed using the data validation form for the West Valley Soil results. The completed checklists are included in Attachments A and B. Laboratory data flags and qualifiers are listed in the attached tables.

Field Quality Control Samples

The frequency and quality of field quality control samples as outlined in the quality assurance project plan (QAPP) and the West Valley Soils Sampling and Analysis Plan (SAP) are discussed in the following sections.

Field Blank Results

Field blanks are used to assess the cleanliness of sampling and analysis activities. All field blank results were less than two times the applicable IDL. They have not resulted in the qualification of any sample results. Field blanks were submitted within the frequency of (1) blank for every (20) samples prescribed by the project sampling and analysis plan.

Field Duplicate Results

Field duplicates are used to assess field and laboratory precision. Field duplicates were submitted at the frequency of (1) field duplicate for every (20) natural samples as prescribed by the project sampling and analysis plan. Field duplicate results for arsenic were within the +/- 35% RPD requirements for field duplicates.

Reference Material Results

Reference Materials were not applicable and were not submitted.

Site: Anaconda, MT
Project: West Valley Soils
Sample Dates: 08/04 to 08/07/03
Data Validator: Jennifer Norman

Sample Matrix: Soil
Analysis Dates: 08/07 to 08/08/03
Validation Dates: 08/12/03

Laboratory: Ashe Analytics
Analyses: As

1. Holding Times

Analyte	Matrix	Method	Holding Time*	Collection Date(s)	Analysis Date(s)	Holding time met? (Y/N)	Affected data flagged? (Y/N)
As	Soil	Clark Fork River Laboratory Analytical Procedure for XRF of Solid Media by Ashe Analytics	Clark Fork LAP	08/04 to 08/07/03	08/07 to 08/08/03	Y	N- N/A

* reference for holding time (Clark Fork River LAP=Laboratory Analytical Procedure of Solid Media by Ashe Analytics)

Were any data flagged because of holding time problems? Y ___ N ✔

2. XRF Quality Control

What sample preparation steps were performed (i.e., drying and sieving, grinding)? Foreign objects such as twigs and rocks were removed from the field sample. The sample was then homogenized and placed in a glass or aluminum vessel and held at a temperature of 105°C for 4 hours. The sample was then cooled in a desiccator to room temperature. The sample was then passed through a U.S. Standard No. 10 sieve. The homogenized and sieved sample was placed in a grinding vessel and ground until 95% of the sample passed through a 200-mesh screen. The prepared sample was then stored in a desiccator until analysis.

Were the samples prepared according to the SAP? Y ✔ N ___
Was an energy calibration performed at the frequency of once per day? Y ✔ N ___
Were initial and continuing calibrations performed at the frequency in Table 8-1 of XRF LAP? Y ✔ N ___
Were the initial and continuing calibration results within control windows? Y ✔ N ___
Was a laboratory duplicate analysis performed at the frequency of 1 per 20? Y ✔ N ___
Were laboratory duplicate results within control window of (Analyte specific)? Y ✔ N ___
Was a laboratory replicate analysis performed at the frequency of 1 per 20? Y ✔ N ___
Were laboratory replicate results within control window of (Analyte Specific)? Y ✔ N ___
Was a cross-contamination check sample analyzed at the frequency of 1 per 50? Y ✔ N ___
Were cross-contamination check sample results within the control window of < than 2x the MDL? Y ✔ N ___
Was a sand blank analysis performed at the frequency of 1 per 50? Y ✔ N ___
Were sand blank results within the control window of less than the MDL? Y ✔ N ___
Were any data flagged because of XRF analysis? Y ___ N ✔

3. Overall Assessment

Are there analytical limitations of the data that users should be aware of? Y ___ N ✔
If so, explain: There are no limitations associated with this data set.

4. Authorization of Data Release from the Laboratory

Data Validator:

Name: Jennifer Norman
Signature: Jennifer Norman
Date: 08/14/03

Data Validation Reviewer:

Name: Pat Seccomb
Signature: Pat Seccomb
Date: 8-14-03

Site:	Anaconda, MT	Sample Matrix:	Soil	Laboratory:	Ashe Analytics
Project:	West Valley Soils	Analysis Dates:	08/07 to 08/08/03	Analyses:	As
Sample Dates:	08/04 to 08/07/03	Validation Dates:	08/12/03		
Data Validator:	Jennifer Norman				

1. Holding Times

Analyte	Matrix	Method	Collection Date	Analysis Date	Affected data flagged? (Y/N)
As	Soil	Clark Fork River Laboratory Analytical Procedure for XRF of Solid Media by Ashe Analytics	08/04 to 08/07/03	08/07 to 08/08/03	N - N/A

2. Field QC Samples

Field Blanks

Were field blanks submitted as specified in the Sampling and Analysis Plan (SAP)? Y ✔ N
Were any data qualified because of field blank problems? Y N ✔

Field Duplicates

Were field duplicates submitted as specified in the SAP? Y ✔ N
Were results for field duplicates within the target control limits in the CFRSSI QAPP? Y ✔ N
Were any data qualified because of field duplicate results? Y N ✔
Comments: None

Field Reference Materials

Were field Reference Materials or Performance Evaluation Samples submitted as specified in the SAP? Y NA N
Were the results within the manufacturer's control limits? Y NA N
Comments: Field reference Materials were not applicable to this effort per the SAP.

I. General Information

Site: Anaconda, MT
Project: West Valley
Client: ARCO
Sample Matrix: Soil

II. Screening Results

Data are:

1) Unusable _____
2) Level A ✔
3) Level B _____

I. Level A Screening

Criteria - The following must be fully documented:	Yes/No	Comments
1. Sampling date	Yes	
2. Sampling team/or leader	Yes	
3. Physical description of sampling location	Yes	
4. Sample depth (soils)	Yes	
5. Sample collection technique	Yes	
6. Field preparation technique	N/A	
7. Sample preservation technique	Yes	
8. Sample shipping records and laboratory analysis dates	Yes	
9. Companion sampling efforts	N/A	
10. Visual classification of samples	Yes	Visual descriptions in samplers' memoranda

II. Level B Screening

Criteria - The following must be fully documented:	Yes/No	Comments
1. Field/laboratory instrumentation, standardization, and methods/procedures	Yes	
2. Proper sample containers and container preparation	Yes	
3. Collection of field replicates (1/20 minimum)	Yes	
4. Proper and decontaminated sampling equipment	N/A	

5. Identity of sample taker	Yes	
6. Field custody documentation	Yes	.
7. Shipping custody documentation	Yes	
8. Traceable sample designation number	Yes	
9. Field notebook(s), custody records in secure repository	Yes	
10. Properly prepared and complete field forms	Yes	
11. Physical data/observations date and time	Yes	Measurements in logbook and memoranda.
12. Physical data/observations recorder, team leader	Yes	
13. Physical data/observations location	Yes	

TO: PIONEER TECHNICAL SERVICES
SHAWN BISCH

AUG. 11, 2003

FROM: ASHE ANALYTICS
JOHN ASHE

SUBJECT: ANALYTICAL REPORT NO. SB0811D
PROJECT: WVRB

EIGHTY (80) SAMPLES WERE RECEIVED ON 08/04/03
FOR TOTAL METALS ANALYSIS (As) BY XRF.
RESULTS ARE PRESENTED BELOW.

LAB NUMBER	SAMPLE I.D.	As mg/kg	As FLAG	SAMPLE PREP GROUP
D-0764	WVRB-WE-0	105		999606
D-0765	WVRB-WE-2	96.5		999606
D-0766	WVRB-WE-8	61		999606
D-0767	WVRB-WE-NG	76.5		999606
D-0768	WVRB-WE-C-0	583		999606
D-0769	WVRB-WE-C-2	418		999606
D-0771	WVRB-WE-C-NG	367		999606
D-0772	WVRB-WE-D-0	126		999606
D-0773	WVRB-WE-D-2	49.2		999606
D-0774	WVRB-WE-D-8	58.8		999606
D-0775	WVRB-WE-D-NG	55.8		999606
D-0776	WVRB-WE-0-12	401		999606
D-0777	WVRB-0-0	2050		999606
D-0778	WVRB-0-2	3320		999606
D-0779	WVRB-0-8	194		999606
D-0780	WVRB-0-NG	201		999606
D-0781	WVRB-15-0	1690		999606
D-0782	WVRB-15-2	2140		999606
D-0783	WVRB-15-NG	82.4		999606
D-0784	WVRB-30-0	1830		999606
D-0785	WVRB-30-2	1470		999606
D-0786	WVRB-40-8	959		999606
D-0787	WVRB-30-NG	48.9		999606
D-0788	WVRB-B-1	8.6	U	999606
D-0789	WVRB-45-0	692		999606
D-0790	WVRB-45-2	1260		999606
D-0791	WVRB-45-8	997		999606
D-0792	WVRB-45-8D	1110		999606
D-0793	WVRB-45-NG	241		999606
D-0794	WVRB-60-0	1600		999606
D-0795	WVRB-60-2	2390		999606
D-0796	WVRB-60-8	856		999606
D-0797	WVRB-60-NG	76.8		999606
D-0798	WVRB-75-0	3260		999606

D-0799	WVRB-75-2	3940	999606
D-0800	WVRB-75-8	1760	999606
D-0801	WVRB-75-NG	116	999607
D-0802	WVRB-90-0	1620	999607
D-0803	WVRB-90-2	876	999607
D-0804	WVRB-90-NG	114	999607
D-0805	WVRB-95-0	1160	999607
D-0806	WVRB-95-0D	1100	999607
D-0807	WVRB-95-2	1870	999607
D-0808	WVRB-95-NG	77	999607
D-0809	WVRB-105-0	2630	999607
D-0810	WVRB-105-2	1520	999607
D-0811	WVRB-105-NG	142	999607
D-0812	WVRB-120-0	2770	999607
D-0813	WVRB-120-2	1980	999607
D-0814	WVRB-120-NG	96	999607
D-0815	WVRB-135A-0	4650	999607
D-0816	WVRB-135A-2	1770	999607
D-0817	WVRB-135-0	3570	999607
D-0818	WVRB-135-2	1390	999607
D-0819	WVRB-135-NG	196	999607
D-0820	WVRB-150-0	2500	999607
D-0821	WVRB-150-2	2030	999607
D-0822	WVRB-150-8	462	999607
D-0823	WVRB-150-NG	96.5	999607
D-0824	WVRB-165-A-8	466	999607
D-0825	WVRB-165-0	2070	999607
D-0826	WVRB-165-2	2700	999607
D-0827	WVRB-165-8	1060	999607
D-0828	WVRB-165-NG	27.2	999607
D-0829	WVRB-165-2D	2560	999607
D-0830	WVRB-180-0	2000	999607
D-0831	WVRB-180-2	1620	999607
D-0832	WVRB-180-NG	27.9	999607
D-0833	WVRB-195-0	1410	999607
D-0834	WVRB-195-2	1230	999607
D-0835	WVRB-195-NG	38.5	999607
D-0836	WVRB-210-0	1130	999607
D-0837	WVRB-210-2	1600	999607
D-0838	WVRB-210-8	1410	999607
D-0839	WVRB-210-NG	87.9	999607
D-0840	WVRB-210-NGD	81	999607
D-0841	WVRB-90A-0	3490	999608
D-0842	WVRB-B-3	8.6 U	999608
D-0843	WVRB-B-4	8.6 U	999608
D-0844	WVRB-B-2	8.6 U	999608

TO: PIONEER TECH. SVCS. AUG. 11, 2003
SHAWN BISCH

FROM: ASHE ANALYTICS
JOHN ASHE

SUBJECT: ANALYTICAL REPORT NO. SB0811QC
LABORATORY QA/QC FOR REPORT DB0811D

LAB NUMBER	SAMPLE I.D.	AS PPM
999606	XCS	3.036
990606	BLANK	

ABOVE BLANKS ASSOCIATED WITH SAMPLE PREP GROUP 999606.
MISSING ENTRIES IMPLY ZERO CONCENTRATION OUTPUT.
ALL READINGS BELOW MDL.

N-2710	ICV, 08/07/03	606.787
CERTIFIED		626
RECOVERY		96.9308

D-0780.1		201.007
D-0780.2	LAB DUP	196.495
D-0780R	LAB REP	200.297
LAB DUP RPD		2.27018
LAB DUP RPD		0.35385

N-2710	LCS	621.208
CERTIFIED		626
RECOVERY		99.2345

ABOVE LCS ASSOCIATED WITH SAMPLES D-0764 THRU D-0780.

D-0800.1		1755.14
D-0800.2	LAB DUP	1722.73
D-0800R	LAB REP	1645.49
LAB DUP RPD		1.86384
LAB DUP RPD		6.44899

999607	XCS	1.123
990607	BLANK	2.463

ABOVE BLANKS ASSOCIATED WITH SAMPLE PREP GROUP 999607.
MISSING ENTRIES IMPLY ZERO CONCENTRATION OUTPUT.
ALL READINGS BELOW MDL.

N-2710	LCS	594.816
CERTIFIED		626
RECOVERY		95.0185

ABOVE LCS ASSOCIATED WITH SAMPLES D-0781 THRU D-0800.

D-0820.1		2501.05
D-0820.2	LAB DUP	2531.58
D-0820R	LAB REP	2430.32
LAB DUP RPD		1.2132
LAB DUP RPD		2.86857

N-2710	LCS	644.535
CERTIFIED		626
RECOVERY		102.961

ABOVE LCS ASSOCIATED WITH SAMPLES D-0801 THRU D-0820.

N-2710	ICV, 08/08/03	631.012
CERTIFIED		626
RECOVERY		100.801

D-0840.1		81.031
D-0840.2	LAB DUP	81.098
D-0840R	LAB REP	98.43
LAB DUP RPD		0.08265
LAB DUP RPD		19.3903

999608	XCS	3.004
990608	BLANK	2.687

ABOVE BLANKS ASSOCIATED WITH SAMPLE PREP GROUP 999608.
MISSING ENTRIES IMPLY ZERO CONCENTRATION OUTPUT.
ALL READINGS BELOW MDL.

N-2710	LCS	635.569
CERTIFIED		626
RECOVERY		101.529

ABOVE LCS ASSOCIATED WITH SAMPLES D-0821 THRU D-0840.

N-2710	LCS	651.28
CERTIFIED		626
RECOVERY		104.038

ABOVE LCS ASSOCIATED WITH SAMPLES D-0841 THRU D-0844.

Lab ID (D-0###)	Field ID	Sample Date	As Dis (mg/kg)	Q	Validation Flag
764	WVRB-WE-0	8/4/2003	105		
765	WVRB-WE-2	8/4/2003	96.5		
766	WVRB-WE-8	8/4/2003	61		
767	WVRB-WE-NG	8/4/2003	76.5		
768	WVRB-WE-C-0	8/4/2003	583		
769	WVRB-WE-C-2	8/4/2003	418		
771	WVRB-WE-C-NG	8/4/2003	367		
772	WVRB-WE-D-0	8/4/2003	126		
773	WVRB-WE-D-2	8/4/2003	49.2		
774	WVRB-WE-D-8	8/4/2003	58.8		
775	WVRB-WE-D-NG	8/4/2003	55.8		
776	WVRB-WE-0-12	8/4/2003	401		
777	WVRB-0-0	8/4/2003	2050		
778	WVRB-0-2	8/4/2003	3320		
779	WVRB-0-8	8/4/2003	194		
780	WVRB-0-NG	8/4/2003	201		
781	WVRB-15-0	8/4/2003	1690		
782	WVRB-15-2	8/4/2003	2140		
783	WVRB-15-NG	8/4/2003	82.4		
784	WVRB-30-0	8/4/2003	1830		
785	WVRB-30-2	8/4/2003	1470		
786	WVRB-40-8	8/4/2003	959		
787	WVRB-30-NG	8/4/2003	48.9		
788	WVRB-B-1	8/4/2003	8.6	U	
789	WVRB-45-0	8/4/2003	692		
790	WVRB-45-2	8/4/2003	1260		
791	WVRB-45-8	8/4/2003	997		
792	WVRB-45-8D	8/4/2003	1110		
793	WVRB-45-NG	8/4/2003	241		
794	WVRB-60-0	8/4/2003	1600		
795	WVRB-60-2	8/4/2003	2390		
796	WVRB-60-8	8/4/2003	856		
797	WVRB-60-NG	8/4/2003	76.8		
798	WVRB-75-0	8/4/2003	3260		
799	WVRB-75-2	8/4/2003	3940		
800	WVRB-75-8	8/4/2003	1760		
801	WVRB-75-NG	8/4/2003	116		
802	WVRB-90-0	8/4/2003	1620		
803	WVRB-90-2	8/4/2003	876		
804	WVRB-90-NG	8/4/2003	114		
805	WVRB-95-0	8/4/2003	1160		
806	WVRB-95-0D	8/4/2003	1100		
807	WVRB-95-2	8/4/2003	1870		
808	WVRB-95-NG	8/4/2003	77		
809	WVRB-105-0	8/4/2003	2630		
810	WVRB-105-2	8/4/2003	1520		
811	WVRB-105-NG	8/4/2003	142		
812	WVRB-120-0	8/4/2003	2770		
813	WVRB-120-2	8/4/2003	1980		
814	WVRB-120-NG	8/4/2003	96		
815	WVRB-135A-0	8/4/2003	4650		
816	WVRB-135A-2	8/4/2003	1770		
817	WVRB-135-0	8/4/2003	3570		
818	WVRB-135-2	8/4/2003	1390		
819	WVRB-135-NG	8/4/2003	196		
820	WVRB-150-0	8/4/2003	2500		
821	WVRB-150-2	8/4/2003	2030		
822	WVRB-150-8	8/4/2003	462		
823	WVRB-150-NG	8/4/2003	96.5		
824	WVRB-165-A-8	8/4/2003	466		
825	WVRB-165-0	8/4/2003	2070		
826	WVRB-165-2	8/4/2003	2700		
827	WVRB-165-8	8/4/2003	1060		
828	WVRB-165-NG	8/4/2003	27.2		
829	WVRB-165-2D	8/4/2003	2560		
830	WVRB-180-0	8/4/2003	2000		
831	WVRB-180-2	8/4/2003	1620		
832	WVRB-180-NG	8/4/2003	27.9		
833	WVRB-195-0	8/4/2003	1410		
834	WVRB-195-2	8/4/2003	1230		
835	WVRB-195-NG	8/4/2003	38.5		
836	WVRB-210-0	8/4/2003	1130		
837	WVRB-210-2	8/4/2003	1600		
838	WVRB-210-8	8/4/2003	1410		
839	WVRB-210-NG	8/4/2003	87.9		
840	WVRB-210-NGD	8/4/2003	81		
841	WVRB-90A-0	8/4/2003	3490		
842	WVRB-B-3	8/4/2003	8.6	U	
843	WVRB-B-4	8/4/2003	8.6	U	
844	WVRB-B-2	8/4/2003	8.6	U	

Field ID	As Dis (mg/kg)	Stat	CFDMS Descriptor
WVRB-WE-0	105	E	
WVRB-WE-2	96.5	E	
WVRB-WE-8	61	E	
WVRB-WE-NG	76.5	E	
WVRB-WE-C-0	583	E	
WVRB-WE-C-2	418	E	
WVRB-WE-C-NG	367	E	
WVRB-WE-D-0	126	E	
WVRB-WE-D-2	49.2	E	
WVRB-WE-D-8	58.8	E	
WVRB-WE-D-NG	55.8	E	
WVRB-WE-0-12	401	E	
WVRB-0-0	2050	E	
WVRB-0-2	3320	E	
WVRB-0-8	194	E	
WVRB-0-NG	201	E	
WVRB-15-0	1690	E	
WVRB-15-2	2140	E	
WVRB-15-NG	82.4	E	
WVRB-30-0	1830	E	
WVRB-30-2	1470	E	
WVRB-40-8	959	E	
WVRB-30-NG	48.9	E	
WVRB-B-1	8.6	E	
WVRB-45-0	692	E	
WVRB-45-2	1260	E	
WVRB-45-8	997	E	
WVRB-45-8D	1110	E	
WVRB-45-NG	241	E	
WVRB-60-0	1600	E	
WVRB-60-2	2390	E	
WVRB-60-8	856	E	
WVRB-60-NG	76.8	E	
WVRB-75-0	3260	E	
WVRB-75-2	3940	E	
WVRB-75-8	1760	E	
WVRB-75-NG	116	E	
WVRB-90-0	1620	E	
WVRB-90-2	876	E	
WVRB-90-NG	114	E	
WVRB-95-0	1160	E	
WVRB-95-0D	1100	E	
WVRB-95-2	1870	E	
WVRB-95-NG	77	E	
WVRB-105-0	2630	E	
WVRB-105-2	1520	E	
WVRB-105-NG	142	E	
WVRB-120-0	2770	E	
WVRB-120-2	1980	E	
WVRB-120-NG	96	E	
WVRB-135A-0	4650	E	
WVRB-135A-2	1770	E	
WVRB-135-0	3570	E	
WVRB-135-2	1390	E	
WVRB-135-NG	196	E	
WVRB-150-0	2500	E	
WVRB-150-2	2030	E	
WVRB-150-8	462	E	
WVRB-150-NG	96.5	E	
WVRB-165-A-8	466	E	
WVRB-165-0	2070	E	
WVRB-165-2	2700	E	
WVRB-165-8	1060	E	
WVRB-165-NG	27.2	E	
WVRB-165-2D	2560	E	
WVRB-180-0	2000	E	
WVRB-180-2	1620	E	
WVRB-180-NG	27.9	E	
WVRB-195-0	1410	E	
WVRB-195-2	1230	E	
WVRB-195-NG	38.5	E	
WVRB-210-0	1130	E	
WVRB-210-2	1600	E	
WVRB-210-8	1410	E	
WVRB-210-NG	87.9	E	
WVRB-210-NGD	81	E	
WVRB-90A-0	3490	E	
WVRB-B-3	8.6	E	
WVRB-B-4	8.6	E	
WVRB-B-2	8.6	E	

E='Enforcement

Table 1. Data Summary with Enforcement and Screening quality Assessment and Level A/B assessment, Flags, and Qualifiers

Field ID	Sample Date	As Dis (mg/kg)	Stat	CFDMS Descriptor	Q	Validation Flag	Comment
WVRB-WE-0	8/4/2003	105	E				
WVRB-WE-2	8/4/2003	96.5	E				
WVRB-WE-8	8/4/2003	61	E				
WVRB-WE-NG	8/4/2003	76.5	E				
WVRB-WE-C-0	8/4/2003	583	E				discrete sample
WVRB-WE-C-2	8/4/2003	418	E				discrete sample
WVRB-WE-C-NG	8/4/2003	367	E				discrete sample
WVRB-WE-D-0	8/4/2003	126	E				discrete sample
WVRB-WE-D-2	8/4/2003	49.2	E				discrete sample
WVRB-WE-D-8	8/4/2003	58.8	E				discrete sample
WVRB-WE-D-NG	8/4/2003	55.8	E				discrete sample
WVRB-WE-0-12	8/4/2003	401	E				
WVRB-0-0	8/4/2003	2050	E				
WVRB-0-2	8/4/2003	3320	E				
WVRB-0-8	8/4/2003	194	E				
WVRB-0-NG	8/4/2003	201	E				
WVRB-15-0	8/4/2003	1690	E				
WVRB-15-2	8/4/2003	2140	E				
WVRB-15-NG	8/4/2003	82.4	E				
WVRB-30-0	8/4/2003	1830	E				
WVRB-30-2	8/4/2003	1470	E				
WVRB-40-8	8/4/2003	959	E				
WVRB-30-NG	8/4/2003	48.9	E				
WVRB-B-1	8/4/2003	8.6	E		U		Blank
WVRB-45-0	8/4/2003	692	E				
WVRB-45-2	8/4/2003	1260	E				
WVRB-45-8	8/4/2003	997	E				
WVRB-45-8D	8/4/2003	1110	E				Duplicate
WVRB-45-NG	8/4/2003	241	E				
WVRB-60-0	8/4/2003	1600	E				
WVRB-60-2	8/4/2003	2390	E				
WVRB-60-8	8/4/2003	856	E				
WVRB-60-NG	8/4/2003	76.8	E				
WVRB-75-0	8/4/2003	3260	E				
WVRB-75-2	8/4/2003	3940	E				
WVRB-75-8	8/4/2003	1760	E				
WVRB-75-NG	8/4/2003	116	E				
WVRB-90-0	8/4/2003	1620	E				
WVRB-90-2	8/4/2003	876	E				
WVRB-90-NG	8/4/2003	114	E				
WVRB-95-0	8/4/2003	1160	E				South RR bed duplicate
WVRB-95-0D	8/4/2003	1100	E				South RR bed duplicate
WVRB-95-2	8/4/2003	1870	E				South RR bed duplicate
WVRB-95-NG	8/4/2003	77	E				South RR bed duplicate
WVRB-105-0	8/4/2003	2630	E				
WVRB-105-2	8/4/2003	1520	E				
WVRB-105-NG	8/4/2003	142	E				
WVRB-120-0	8/4/2003	2770	E				
WVRB-120-2	8/4/2003	1980	E				
WVRB-120-NG	8/4/2003	96	E				
WVRB-135A-0	8/4/2003	4650	E				Opportunistic Sample
WVRB-135A-2	8/4/2003	1770	E				Opportunistic Sample
WVRB-135-0	8/4/2003	3570	E				
WVRB-135-2	8/4/2003	1390	E				
WVRB-135-NG	8/4/2003	196	E				
WVRB-150-0	8/4/2003	2500	E				
WVRB-150-2	8/4/2003	2030	E				
WVRB-150-8	8/4/2003	462	E				
WVRB-150-NG	8/4/2003	96.5	E				
WVRB-165-A-8	8/4/2003	466	E				Opportunistic Sample
WVRB-165-0	8/4/2003	2070	E				
WVRB-165-2	8/4/2003	2700	E				
WVRB-165-8	8/4/2003	1060	E				
WVRB-165-NG	8/4/2003	27.2	E				
WVRB-165-2D	8/4/2003	2560	E				Duplicate
WVRB-180-0	8/4/2003	2000	E				
WVRB-180-2	8/4/2003	1620	E				
WVRB-180-NG	8/4/2003	27.9	E				
WVRB-195-0	8/4/2003	1410	E				
WVRB-195-2	8/4/2003	1230	E				
WVRB-195-NG	8/4/2003	38.5	E				
WVRB-210-0	8/4/2003	1130	E				
WVRB-210-2	8/4/2003	1600	E				
WVRB-210-8	8/4/2003	1410	E				
WVRB-210-NG	8/4/2003	87.9	E				
WVRB-210-NGD	8/4/2003	81	E				Duplicate
WVRB-90A-0	8/4/2003	3490	E				Opportunistic Sample
WVRB-B-3	8/4/2003	8.6	E		U		Blank
WVRB-B-4	8/4/2003	8.6	E		U		Blank
WVRB-B-2	8/4/2003	8.6	E		U		Blank

APPENDIX B

RDU 5 WEST VALLEY RAILROAD BED INVESTIGATION SAMPLING AND ANALYSIS PLAN (SAP)

ANACONDA SMELTER NPL SITE
ANACONDA REGIONAL WATER, WASTE & SOILS OPERABLE UNIT

Draft Final

RDU 5 West Valley Railroad Bed Investigation Sampling and Analysis Plan (SAP)

Atlantic Richfield Company

July 9, 2003

ANACONDA SMELTER NPL SITE
ANACONDA REGIONAL WATER, WASTE & SOILS OPERABLE UNIT

Draft Final

RDU 5 West Valley Railroad Bed Investigation Sampling and Analysis Plan (SAP)

Prepared for:

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July 9, 2003

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1.0 INTRODUCTION AND PROJECT DESCRIPTION

1.1 Project Organization

This West Valley Railroad Bed Investigation Sampling and Analysis Plan (SAP) identifies the tasks and sampling methods necessary to obtain the required data and information to further characterize the West Valley Railroad Bed located within Remedial Design Unit (RDU) 5 of the Anaconda Regional Water, Waste & Soils (ARWW&S) Operable Unit (OU). All work identified in this SAP will be undertaken by the Atlantic Richfield Company (Atlantic Richfield) or their representatives with U. S. Environmental Protection Agency (EPA) and Montana Department of Environmental Quality (DEQ) (the Agencies) oversight. This work will be performed in support of the ARWW&S OU and Community Soils (CS) OU *Records of Decision* (RODs) (EPA, 1998 and 1996; respectively) and ARWW&S OU *Remedial Design Work Plan* (RDWP) (CDM, 2000).

1.2 Purpose and General Objectives

It is necessary to further characterize the extent of arsenic contamination within the West Valley Railroad Bed. Surface sampling (0 to 2-inch depth interval) was conducted on the railroad beds in the fall of 1997 and spring of 1998; sampling results are presented in the *Anaconda Residential Soils, Regional Soils, and Railroad Areas Data Interpretive Report* (AERL, 1999). Arsenic concentrations in the surface samples collected from the West Valley Railroad Bed generally exceeded 1,000 milligrams per kilogram (mg/kg). It is necessary to refine the depth and extent of the arsenic contamination present in the railroad bed embankment.

1.3 Scope of Project

The scope of this SAP is limited to the railroad bed known as the West Valley portion of the RDU 5 railroad, as identified on Figure 1. The intent of this SAP is to determine the extent of arsenic contamination present in the railroad bed. The scope of this project is to conduct soil sampling at specific depth intervals through the railroad bed from the ground surface to the railroad ballast/native soil interface immediately below the railroad bed. Additionally, native soil below the railroad bed (from the railroad ballast/native soil interface to approximately 6 inches below the interface) will be sampled. The sample locations are identified on Figures 2A and 2B, and Table 1. The methodology and procedures described in this SAP are designed to be consistent with the procedures for sampling active railroad beds as presented in the previously approved *Remedial Design Sampling and Analysis Plan, RR Beds, Yards, and Adjacent Areas* (AERL, 1997).

1.4 Description of Activities

To further characterize arsenic contamination within the railroad bed, it is necessary to sample the beds at depth. Test pits will be excavated through the railroad bed (outside of the ties as not to disturb the rails and ties) as shown on Figures 3 and 4, and will be used to obtain soil samples to determine the concentration of arsenic through the profile of the railroad grade. Atlantic Richfield and its representatives will perform the work with Agency oversight.

A backhoe will be utilized to complete the test pits within the existing West Valley railroad. Test pits will be excavated near the outside edges of the ties to obtain the required soil lithologies, depth information (depth-to-native soils) and to collect soil samples at specific depth intervals (0 to 2 inches, 2 to 6 inches, 6 to 18 inches, and 18 to 24 inches, or as modified in the field according to site-specific conditions). Atlantic Richfield personnel will log and document in the field logbook, soil lithologies observed on the test pit walls. Copies of the test pit logs will be provided in the West Valley Railroad Bed Investigation Data Summary Report (DSR).

Composite samples will be collected from specific depth intervals from four test pits evenly spaced along the railroad bed. Test pits will be spaced 500 lineal feet from each other on alternating sides of the tracks and ties (see Figure 3); therefore, each composite sample will represent a 1,500-foot section of the railroad bed. It is anticipated that four subsamples will be collected from each test pit corresponding with the following depth intervals (see Figure 4):

- 0 to 2 inches (surface sample).
- 2 to 6 inches, corresponding with the upper portion of the ballast section that has likely been disturbed throughout the history of the railroad bed due to tie replacement or other surface maintenance.
- 6 to 18 inches (+ or -), corresponding with the lower portion of the ballast section that likely has not been disturbed throughout the history of the railroad bed. The lower limit of this interval will correspond with the ballast/native soil interface.
- 18 to 24 inches (+ or -), corresponding with approximately 6 inches of native soil underlying the railroad bed.

The 0 to 2-inch depth interval subsamples from 4 successive test pits spaced 500 lineal feet apart will be homogenized as a single composite sample (representing a 1,500-foot section of the railroad bed). Similarly, the 2 to 6-inch depth interval subsamples from 4 successive test pits will be composited (representing a 1,500-foot section of the railroad bed), and so on. If sampling personnel (or Agency personnel) detect areas of concern while visually observing the test pits, additional samples may be collected for analyses. Additional sampling and analysis will be at the discretion of the on-site personnel. Soil samples will be analyzed by X-Ray Fluorescence (XRF) Spectroscopy for total arsenic.

Soil sampling and analysis, and existing data will be utilized to further characterize the extent of arsenic contamination associated with the West Valley Railroad Bed.

1.5 Schedule

Implementation of this SAP will commence shortly after approval of this SAP and is estimated to start during the summer of 2003. It is estimated that the field activities will take up to 5 working days to complete depending on soil conditions, weather, and equipment availability. Upon completion of the field activities and receipt of analytical data, the RDU 5 West Valley Railroad Bed Investigation DSR will be completed and submitted to the Agencies.

1.6 Data Users and Decision Makers

Results of activities described in this SAP will be used to delineate the depth of contamination present in the West Valley Railroad Bed. The principal decision makers must ensure that appropriate information of sufficient quality and quantity is made available so that the contaminant characterization can be completed. The principal decision makers include:

- Charlie Coleman – EPA;
- Brian Bartkowiak - DEQ; and
- Steve Ferry – Atlantic Richfield.

2.0 SITE BACKGROUND

2.1 Operable Unit Description

The ARWW&S OU covers an area of approximately 300 square miles of the southern Deer Lodge Valley and surrounding foothills in southwest Montana. The elevation is approximately 4,800 feet above mean sea level (amsl) near the community of Warm Springs and 6,000 feet amsl on Stucky Ridge. Three streams drain most of the OU; Warm Springs Creek; Lost Creek; and Mill Creek. This OU is part of the Anaconda Smelter National Priorities List (NPL) Site, which contains large volumes of wastes, debris, and contaminated soils from the processing of ores to recover metals, chiefly copper. These milling, smelting, and refining activities continued for a period of 96 years, from 1884 until 1980. The ARWW&S OU area was divided into three general areas of topography; floodplain area; lowland area; and upland area. The floodplain area is defined by the boundary of the 100-year floodplain and is restricted to narrow corridors along primary streams. Lowlands are located above the 100-year floodplain to the intersection of the floor of the Deer Lodge Valley with the surrounding foothills. Uplands include foothills of slope steepness less than 10 percent (%) to greater than 50%. Due to the large size of this OU, it was divided into subareas.

These subareas and associated areas of concern were characterized in the Remedial Investigation/Feasibility Study (RI/FS) process and several documents have been prepared including RI Reports (ARCO, 1996a; ARCO, 1996b; PTI, 1996), Risk Assessments (CDM Federal, 1997a and 1996a), Conceptual Model for Fate & Transport (Titan Environmental Corporation, 1996), and FSs (CDM Federal, 1997b and 1996b).

2.2 West Valley Railroad Bed Description

The western extent of the RDU 5 West Valley Railroad Bed Investigation Area corresponds with the intersection of the railroad bed with North Cable Road approximately 4 miles west of the community of Anaconda, Montana. The eastern extent of the RDU 5 West Valley Railroad Bed Investigation Area corresponds with the intersection of the railroad bed with Pennsylvania Avenue (located immediately west of the West Anaconda Yards, see Figure 2B). The West Valley railroad bed is currently an active railroad bed; rails and ties remain in-place. This railroad bed includes 1 crossing of Warm Springs Creek, where the creek intersects the railroad

grade approximately 0.3 miles west of Anaconda. The RDU 5 West Valley Railroad Bed is generally characterized by contaminated ballast associated directly with the railroad grade.

There are three Potentially Responsible Parties (PRPs) affiliated with RDU 5: Atlantic Richfield, RARUS Railway and Burlington Northern/Santa Fe (BNSF). RARUS Railway was notified as being a PRP for the Active Railroad on September 7, 2000. The PRPs will be responsible for the preparation of the Remedial Action Work Plan/Final Design Report (RAWP/FDR), including all relevant designs.

2.3 Remedial Action Objectives

Remedial Action Objectives (RAOs) pertaining to the RDU 5 West Valley Railroad Bed are defined in Section 9 of the CS OU ROD (EPA, 1996).

2.3.1 Soil/Waste Objectives

RAOs for contaminated railroad beds as defined in the CS OU ROD (EPA, 1996) include the following:

- *"Design engineered covers to prevent direct contact with, and reduce potential for erosion and transport of, contaminated railroad bed materials.*
  - *Engineered covers shall be designed to provide an effective and permanent barrier to waste materials.*
- *Design engineered barriers to restrict access to railroad bed and to control surface runoff.*
  - *Barriers shall be designed to prevent contaminated railbed material from eroding to adjacent residential areas."*

2.4 Previous Investigations and Actions

The following is a list of documents prepared for investigations and response actions that have been performed on or in the vicinity of RDU 5:

- AERL, 1997. Anaconda Smelter NPL Site, Community Soils Operable Unit. *Remedial Design Sampling and Analysis Plan, RR Beds, Yards and Adjacent Areas.* September 1997.
- AERL, 1999. *Anaconda Residential Soils, Regional Soils, and Railroad Areas Data Interpretive Report.*
- Advisory Council on Historic Preservation, Second Programmatic Agreement, 1994. *Memorandum of Agreement Regarding Implementation if the CERCLA Related Elements of the Upper Clark Fork River Basin Regional Historic Preservation Plan.* December 1994.
- ARCO, 1997. Anaconda Regional Water, Waste, and Soils Operable Unit: *Revised Conceptual Model of Fate & Transport, Pathway Assessment, and Areas and/or Media of Concern.* Prepared for AERL. February 1997.
- Camp, Dresser, McKee, (CDM) Inc., 1987. *Final Data Report for Solid Matrix Screening Study, Anaconda Smelter Site, Anaconda, Montana, Performance of Remedial Response*

Activities of Uncontrolled Hazardous Waste Sites. Prepared for U.S. Environmental Protection Agency 1987.

- CDM Federal Programs Corp., 1996. *Final Baseline Human Health Risk Assessment, Anaconda Smelter NPL Site.* January 1996.
- EPA, 1996. *Final Feasibility Study, Deliverable No. 3B for Anaconda Regional Water, Waste and Soils Unit (Identification of Problem Statement, Remediation Goals and Objectives, Waste Removal Evaluation, Development of Alternatives, Alternative Selection for Each Subarea).* Prepared for U.S. Environmental Protection Agency. October 24, 1996.
- Pioneer Technical Services, Inc., 2000. *Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit Dedicated Development Plan.* Prepared for AERL. August 2000.
- PTI Environmental Services, 1992. *Anaconda Soil Investigation Data Summary/Data Validation/Data Usability Report.* March 1992.
- PTI Environmental Services, 1993. Anaconda Soil Investigation Phase II Data Summary/Data Validation/Data Usability. January 1993.
- Titan Environmental Corp., 1996. *Conceptual Model of Contaminant Fate and Transport, Pathway Assessment, and Areas and/or Media of Concern*; Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit. Prepared for AERL.

3.0 DATA QUALITY OBJECTIVES

The Data Quality Objectives (DQOs) process (EPA, 2000a) is an iterative, strategic planning approach designed to ensure that the type, quality, and quantity of environmental data used in decision-making are appropriate for the intended application. Once established, the DQOs are used to develop a scientific and resource-effective data collection design. The following sections describe the process as it relates to the RDU 5 West Valley Railroad Bed Investigation SAP.

3.1 Data Quality Objective Process

The DQO process specifies project decisions, the data quality required to support those decisions, specific data types needed, data collection requirements, and analytical techniques necessary to generate the specified data quality. The process also ensures that the resources required to generate the data are justified. The DQO process consists of seven steps of which the output from each step influences the choices that will be made later in the process. These steps include:

Step 1: State the Problem;
Step 2: Identify the Decision;
Step 3: Identify the Inputs to the Decision;
Step 4: Define the Study Boundaries;
Step 5: Develop a Decision Rule;
Step 6: Specify Tolerable Limits on Decision Errors; and
Step 7: Optimize the Design.

During the first six steps of the process, the planning team develops decision performance criteria that will be used to develop the data collection design. The final step of the process

involves developing the data collection design based on the DQOs. A brief discussion of these steps and their application to this project are provided below.

Step 1: State the Problem.
The purpose of this step is to describe the problem to be studied so that the focus of the investigation will not be ambiguous.

Surficial (0 to 2-inch depth) soil samples collected in 1997 showed arsenic concentrations along the West Valley Railroad Bed to be above 1,000 mg/kg. It is necessary to further characterize the material present in the railroad bed as well as the underlying soils to identify the extent of contaminant source(s) at depth.

Step 2: Identify the Decision.
This step identifies what questions the study will attempt to resolve and what actions may result. The key questions may be stated as follows:

- *What are the soil characteristics within the West Valley Railroad Bed?*

- *What is the extent of the constituent source(s) within the West Valley Railroad embankment?*

Step 3: Identify the Inputs to the Decision.
The purpose of this step is to identify the informational variables that will be required to resolve the decision statements and determine which variables require environmental measurements.

The following data and information are required to satisfy or resolve the decision statements:

- Soil lithologies from the test pit walls;
- Survey data for the location of test pits;
- Soil analytical results from the railroad bed along the West Valley Line;
- Soil analytical results for the native soils underlying the railroad bed of the West Valley Line; and
- Approximate location(s) (depth extent) of contaminant source(s) within the West Valley Railroad Line.

Step 4: Define the Study Boundaries.
The purpose of this step is to define the spatial and temporal boundaries of the problem. The study area will be limited to the West Valley Railroad Bed from where it crosses North Cable Road northwest of Anaconda to its crossing at Pennsylvania Avenue within the city limits of Anaconda.

This investigation will begin in the summer of 2003. The RDU 5 West Valley Railroad Bed Investigation DSR will be completed and submitted in the fall of 2003.

Step 5: Develop a Decision Rule.
The purpose of this step is to define the parameters of interest, specify action levels, and integrate any previous DQO inputs into a single statement.

Soil samples will be collected from specific depth intervals within the West Valley Railroad Bed at multiple locations between its intersection with North Cable Road, northwest of Anaconda to its crossing at Pennsylvania Avenue within the community of Anaconda. Test pits will be excavated outside of the ties on alternating sides of the railroad bed to where native soils are encountered. Soil samples will be collected and analyzed at depth intervals of 0 to 2 inches, 2 to 6 inches and 6 to18 inches (approximately, corresponding to the ballast/native soil interface). Additionally, one sample will be collected from the underlying native soil at 0 to 6 inches below the ballast/native soil interface. If sampling personnel (or Agency personnel) detect areas of concern while visually observing the test pit samples, additional samples will be collected for analyses at the discretion of the on-site personnel. Soil samples will be analyzed for total arsenic via XRF Spectroscopy. The test pits will be refilled once the sampling is completed, and the sample locations will be surveyed. In addition to soil sampling, data collection will involve recording soil lithologies observed in each test pit and depth-to-native soil.

Based on the review and interpretation of the above data, the extent of contamination present in the West Valley Railroad Bed will be determined.

The EPA developed risk-based screening levels for arsenic based on residential, agricultural worker, commercial worker, and recreational/dirt biker exposure scenarios. Screening levels for the different exposure scenarios have been developed for a carcinogenic risk range of 10^{-6} to 10^{-3} and a non-carcinogenic hazard index of 1. Risk-based screening levels for arsenic are provided on Table 2.

For the residential scenario, the range of screening levels for soil arsenic concentrations encompassing EPA's target risk range is 3 mg/kg ($1x10^{-6}$) to 297 mg/kg ($1x10^{-4}$). The EPA considered this an appropriate range from which to select an action level. The EPA selected the arsenic action level for residential surficial soils to be 250 mg/kg. This corresponds to an excess cancer risk of $8x10^{-5}$ and is within EPA's target risk range.

For the commercial worker scenario, the range of screening levels for soil arsenic concentrations encompassing EPA's targeted risk range is 13.3 mg/kg ($1x10^{-6}$) to 1,130 mg/kg ($1x10^{-4}$). For the recreational user scenario, the range of screening levels for soil arsenic concentrations encompassing EPA's targeted risk range is 23.3 mg/kg ($1x10^{-6}$) to 2,323 mg/kg ($1x10^{-4}$). The EPA considered this an appropriate range from which to select an action level. An arsenic action level of 500 mg/kg for surface soils and waste material in commercial/industrial land use areas and 1,000 mg/kg for recreational/open space land use areas were previously identified in the *Remedial Design Work Plan/Final Design Report (RAWP/FDR) Old Works/East Anaconda Development Area (OW/EADA) OU Volume I* (ARCO, 1994), and were based on the OW/EADA Baseline Risk Assessment. For consistency at the Anaconda Smelter NPL Site, it is EPA's intent to continue to apply these action levels at remaining commercial/industrial and recreational/open space land use areas through the CS OU ROD (EPA, 1996).

The EPA and DEQ have established a 2,500 mg/kg arsenic action level for steep slope/open space land use. The EPA and DEQ have determined that it is technically impracticable to apply certain land reclamation techniques to specific steep and rocky slopes and, therefore, may not achieve the 1,000 mg/kg arsenic action level. However, other types of reclamation alternatives

(i.e., hand planting of trees, shrubs, and grass seedlings) are technically practicable and may be Implemented in certain areas. Furthermore, because some lands are currently owned by Atlantic Richfield and specific Institutional Controls (ICs) (deed restrictions) and adequate fencing restricts human and wildlife access, the 2,500 mg/kg arsenic action level is deemed protective for some areas.

Human health arsenic cleanup action levels for surficial soils at the Anaconda Smelter NPL Site are listed on Table 3.

The current and reasonably anticipated future land use for the West Valley Railroad bed within the ARWW&S OU is a dedicated development, and therefore the 1,000 mg/kg arsenic action level applies.

Step 6: Specify Tolerable Limits on Decision Errors.
The purpose of this step is to specify the decision maker's tolerable limits on decision errors, which are used to establish performance goals for the data collection design.

There are limitations in evaluating data over a given area. The RDU 5 West Valley Railroad Bed Investigation SAP has been developed to obtain the necessary data to further characterize the soils/wastes along the railroad grade and determine the extent to which constituents are present. Additional test pits and samples will depend on the visual observations and field data obtained during the investigation. The addition of test pits and/or samples will be discussed and agreed upon by Atlantic Richfield, Atlantic Richfield representatives and Agency representatives in the field and will be documented in the field logbook. The SAP proposes that an adequate quantity of data will be collected to confidently define the extent of contamination present in the West Valley Railroad Bed.

These data should have a confidence and precision in fair agreement with previously collected data and with quality control criteria.

Step 7: Optimize the Design.
The purpose of this step is to identify a resource-effective data collection design for generating data that are expected to satisfy the DQOs.

Existing surface sampling data (0 to 2-inch depth) is available for the West Valley Railroad Bed. Deeper subsurface soil samples will be collected to refine estimates of the extent of contamination within the railroad bed. The rationale for sampling locations and methodology presented in this SAP is consistent with the previously approved *Remedial Design Sampling and Analysis Plan, RR Beds, Yards, and Adjacent Areas* (AERL, 1997).

Composite samples will be collected from specific depth intervals from four test pits evenly spaced along the railroad bed. Test pits will be spaced 500 lineal feet from each other on alternating sides of the tracks and ties; therefore, each composite sample will represent a 1,500-foot section of the railroad bed. It is anticipated that 4 subsamples will be collected from each test pit corresponding with the following depth intervals: 0 to 2 inches; 2 to 6 inches; 6 to 18 inches; and 18 to 24 inches. If sampling personnel (or Agency personnel) detect areas of

concern while visually observing the test pits and samples, additional samples may be collected for analyses. Additional sampling and analysis will be at the discretion of the on-site personnel. Soil samples will be analyzed by XRF Spectroscopy for total arsenic. Soil samples from the test pits will provide soil concentrations necessary to determine the extent of the contaminant source(s).

Soil lithologies will be obtained from ground surface to the ballast/native soil interface plus an additional 6 inches (approximately) below the ballast/native soil interface. Atlantic Richfield personnel will log and document the soil lithologies in the field logbook. A copy of the soil lithologies will be provided in the RDU 5 West Valley Railroad Bed DSR. The sample locations will be surveyed. The test pits will provide the additional information necessary to characterize contamination present in the railroad bed.

3.2 Data Measurement Objectives

The field Quality Assurance (QA) program for this SAP has been designed to incorporate the field QA procedures developed in the following: *Clark Fork River Superfund Site Investigation (CFRSSI) Standard Operating Procedure (SOPs) G-4 Field Logbook/Photographs* (ARCO, 1992a); and *CFRSSI SOP SS-1 Sample Collection from Soil Borings, Excavations, and Hand Dug Pits* (ARCO, 1992a).

4.0 SAMPLING AND ANALYSIS

4.1 Data Collection Design and Rationale

The data generated by implementing this SAP will be used to further characterize contamination present in the West Valley Railroad Bed. Collection of soil sample data, characterization of the soils, and soil analytical results will identify locations and extent the contaminant source(s) associated with the West Valley Railroad Bed.

Test pits will be spaced 500 lineal feet from each other on alternating sides of the tracks and ties (see Figure 3); therefore, each composite sample will represent a 1,500-foot section of the railroad bed. It is anticipated that four subsamples will be collected from each test pit corresponding with the following depth intervals (see Figure 4):

- 0 to 2 inches (surface sample).
- 2 to 6 inches, corresponding with the upper portion of the ballast section that has likely been disturbed throughout the history of the railroad bed due to tie replacement or other surface maintenance).
- 6 to 18 inches (+ or -) corresponding with the lower portion of the ballast section that likely has <u>not</u> been disturbed throughout the history of the railroad bed. The lower limit of this interval will correspond with the ballast/native soil interface.
- 18 to 24 inches (+ or -) corresponding with approximately 6 inches of native soil underlying the railroad bed.

The 0 to 2-inch depth interval subsamples from 4 successive test pits spaced 500 lineal feet apart

will be homogenized as a single composite sample (representing a 1,500-foot section of the railroad bed). Similarly, the 2 to 6-inch depth interval subsamples from 4 successive test pits will be composited (representing a 1,500-foot section of the railroad bed), and so on. The test pit face will be scraped to reveal fresh, non-smeared surfaces and the sample will be collected using a clean disposable scoop. The composite will then be thoroughly mixed in a new disposable aluminum container. During this homogenization process, large particles (>0.5-inch diameter) will be discarded. The composite will be placed in a clean, labeled sample container. Sample volumes will consist of approximately 500 to 800 grams of material. Sample containers will be placed in a container (i.e., cooler) for transport to the analytical laboratory. If sampling personnel (or Agency personnel) detect areas of concern while visually observing the test pits, additional samples may be collected for analyses. Additional sampling and analysis will be at the discretion of the on-site personnel. Soil samples will be analyzed by XRF Spectroscopy for total arsenic.
Atlantic Richfield is proposing that 56 soil samples be obtained from the West Valley Railroad Bed. After samples are collected, test pits will be refilled with the material that had been removed. The sample locations will be surveyed using Global Positioning System (GPS).

Collection of the data described in Section 3.1, Step 5 of this SAP and the samples detailed on Table 4, will provide the necessary information to further characterize the extent of the contamination within the West Valley Railroad Bed.

4.2 Sampling Equipment

The test pits will be excavated using a backhoe. The unit will be equipped with the necessary decontamination equipment and will be decontaminated before leaving the site. Single use scoops and aluminum containers will be used to collect and mix the samples. A summary of the samples to be collected from each site is shown on Table 4. A list of equipment and materials required for soil sampling is presented on Table 5.

4.2.1 Test Pit Description

A description of all notable soil horizons or lithologies will be completed and documented in the field logbook. The description will include United States Department of Agriculture (USDA) textural class and color. Additional features such as depth to ballast/native soil interface, rooting depth, soil structure, cobble coatings, mottling and salt accumulations will also be noted.

Atlantic Richfield is proposing that soil samples be obtained from 55 test pits excavated in the West Valley Railroad Bed.

4.2.2 Sample Disposal

Soil samples collected for visual inspection will be disposed of in the area surrounding the test pit. The soil samples shipped to the laboratory for analysis will be held until the laboratory analysis has been completed and then returned to Atlantic Richfield for storage.

4.3 Sample Identification

The data collected from the soil samples will be identified using the following requirements:

- A four letter prefix denoting location (WVRB);
- A two or three-number code denoting the sample location;
- A numeric code for the soil sample interval, 0 for 0 to 2-inch interval, 2 for the 2 to 6-inch interval and 6 for the 6 to 18-inch interval (ballast/native soil interface);
- NG will be used instead of the numeric code to indicate the native soil sample;
- A field duplicate sample will have a "D" inserted after the numeric code; and
- QA/Quality Control (QC) Blank samples will have a "B" inserted in the sample location code.

An example identification number would be: WVRB-20-2. This identification number would correspond to the composite sample starting at Station 20+00 on the railroad grade and the 2 to 8-inch depth interval. Approximate sample locations are shown on Figures 2A and 2B and sample numbers are identified on Table 4.

4.4 Field Documentation

All field entries will be recorded in a bound field logbook and the will be completed prior to proceeding to the next location. All entries will be consistent with *CFRSSI SOP G-4* (ARCO, 1992a). Specific entries will include, but are not limited to; test pit location, date and time, weather conditions, personnel present and associated organization, field soil descriptions, samples collected and any deviations from the SAP protocol. Location sketches will be included where appropriate and test pit locations will be surveyed.

4.5 Field Activities Oversight

If desired, Agency field oversight can be conducted on a continuous basis during all field activities associated with this project. Agency oversight personnel will have the ability to inspect each test pit and determine the appropriateness of the recorded data and ensure that the appropriate samples were collected. Atlantic Richfield will provide copies of field logbook pages to the Agency oversight personnel upon request.

Any deviations from the SAP will be brought to the attention of Agency oversight personnel, or if first determined by oversight personnel, the contractor will be immediately notified. Reasons for such deviations will be recorded in the field logbook, along with corrective actions to be implemented, if required. If Agency oversight personnel request a deviation from the SAP, the deviation, and the reasons for the deviation will be noted and then signed by the Agency personnel.

5.0 QUALITY CONTROL

Sample QC protocols will be consistent with *CFRSSI SOP G-6* (ARCO, 1992a) and will include 1 field duplicate, and 1 field blank collected for every 20 primary samples. All sampling equipment will be "one time use"; therefore, no external contamination blank/cross contamination blank (ECB/CCB) samples will be submitted. Samples will be analyzed by XRF Spectroscopy for total arsenic. All laboratory analysis will be completed using Contract Laboratory Program (CLP) protocols. Any deviations from the SOPs or SAP will be identified and discussed in the RDU 5 West Valley Railroad Bed Investigation DSR.

6.0 DATA VALIDATION

The general approach to data validation is described in the *Clark Fork River Superfund Investigation Data Management/Data Validation Plan, Revision 2* (ARCO, 1992b). A simplified validation system will be implemented consistent with procedures described in the EPA *Addenda to the Clark Fork River Superfund Site Investigations Data Management/Data Validation Plan* (EPA, 2000b).

7.0 RECORDS AND REPORTS

A final report will be prepared following data collection, evaluation, validation and interpretation. The report will include figures displaying the test pit locations and analytical results. The report will include copies of all field data and all daily logbook entries. The data will reside in Atlantic Richfield's Remedial Design/Remedial Action (RD/RA) Geographic Information System (GIS) database.

8.0 HEALTH AND SAFETY PLAN

A Job Safety Analysis (JSA) will be completed for the site-specific investigation activities prior to implementing this SAP.

9.0 REFERENCES

AERL, 1997. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit. Remedial Design Sampling and Analysis Plan, RR Beds, Yards, and Adjacent Areas.

AERL, 1999. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit. Anaconda Residential Soils, Regional Soils, and Railroad Areas Data Interpretive Report.

ARCO, 1994. Anaconda Smelter NPL Site, Remedial Design Work Plan/Final Design Report (RAWP/FDR) for the Old Works/East Anaconda Development Area (OW/EADA) Volume I.

ARCO, 1992a. Clark Fork River Superfund Site Investigations Standard Operating Procedures. Prepared for ARCO. September 1992.

ARCO, 1992b. Clark Fork River Superfund Site Investigation Data Management/Data Validation (DM/DV) Plan, Revision 2.

CDM, 2000. Remedial Design Work Plan. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit. June 2000.

EPA, 1996. Record of Decision, Community Soils Operable Unit, Anaconda Smelter NPL Site, Anaconda, Montana.

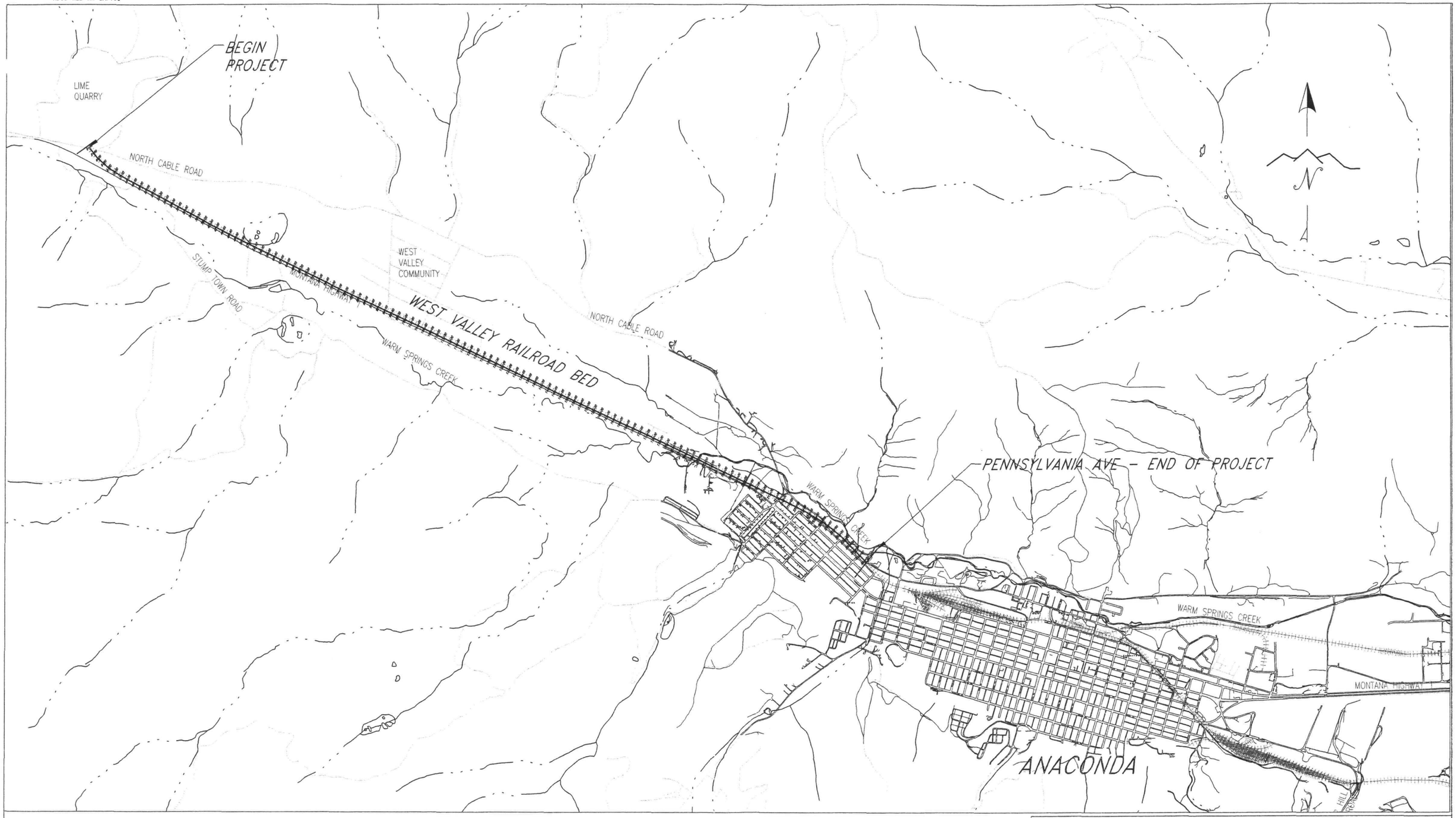
EPA, 1998. Anaconda Smelter NPL Site, Anaconda Regional Water, Waste and Soils Operable Unit Record of Decision. September 1998.

EPA, 2000a. U. S. Environmental Protection Agency Guide for Data Quality Objectives Process, QA/G-4. August 2000.

EPA, 2000b. Addenda to Clark Fork River Superfund Site Investigations Data Management/Data Validation Plan. February 15, 2000.

FIGURES

RDU5-RES-RR-SAP100

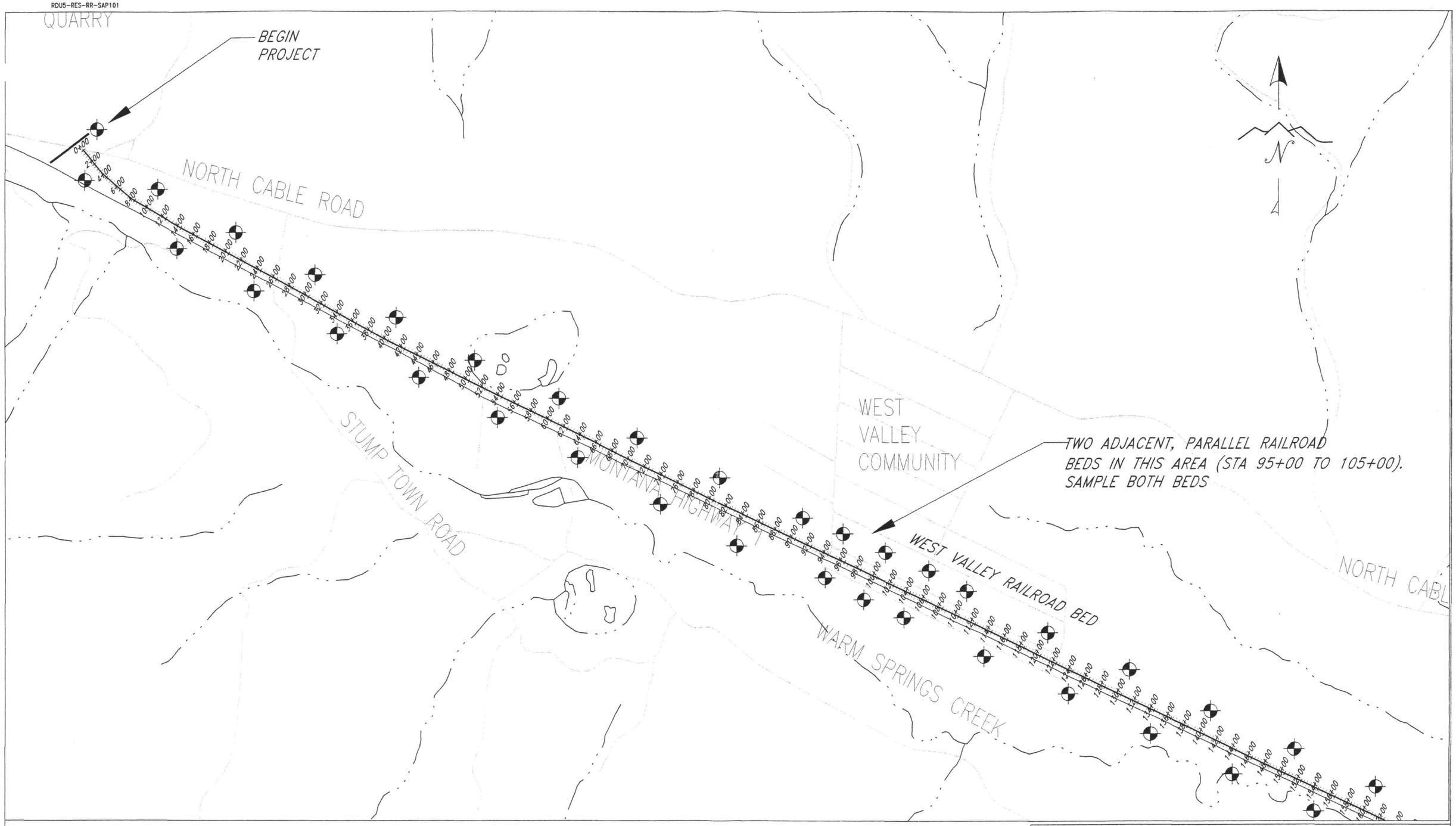


PIONEER TECHNICAL SERVICES, INC.

FIGURE 1
WEST VALLEY RAILROAD BED
INVESTIGATION SITE MAP
AND PROJECT LIMITS

SCALE: 1"=3000'
DATE: 7/8/03

RDU5-RES-RR-SAP101



PROPOSED TEST PIT LOCATION

PIONEER TECHNICAL SERVICES, INC.

FIGURE 2A
WEST VALLEY RAILROAD BED
INVESTIGATION
TEST PIT LOCATIONS
SCALE: 1"=1000'
DATE: 5/23/03

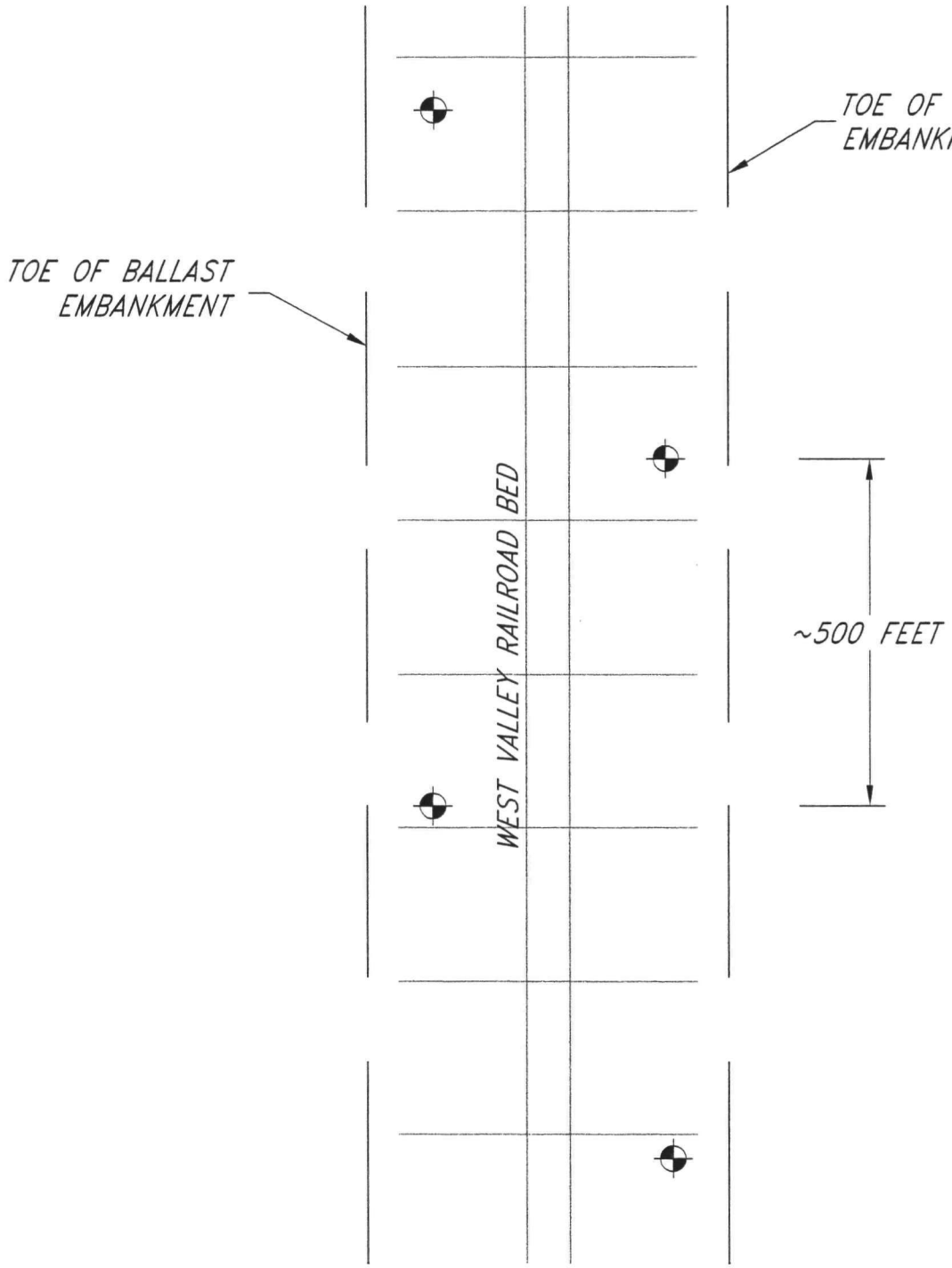
RDU5-RES-RR-SAP103

TEST PIT LOCATION

PIONEER
TECHNICAL SERVICES, INC.

FIGURE 2B
WEST VALLEY RAILROAD BED
INVESTIGATION
TEST PIT LOCATIONS
SCALE: 1"=1000'
DATE: 7/8/03

FOUR SUBSAMPLES WILL COMPRISE A COMPOSITE SAMPLE

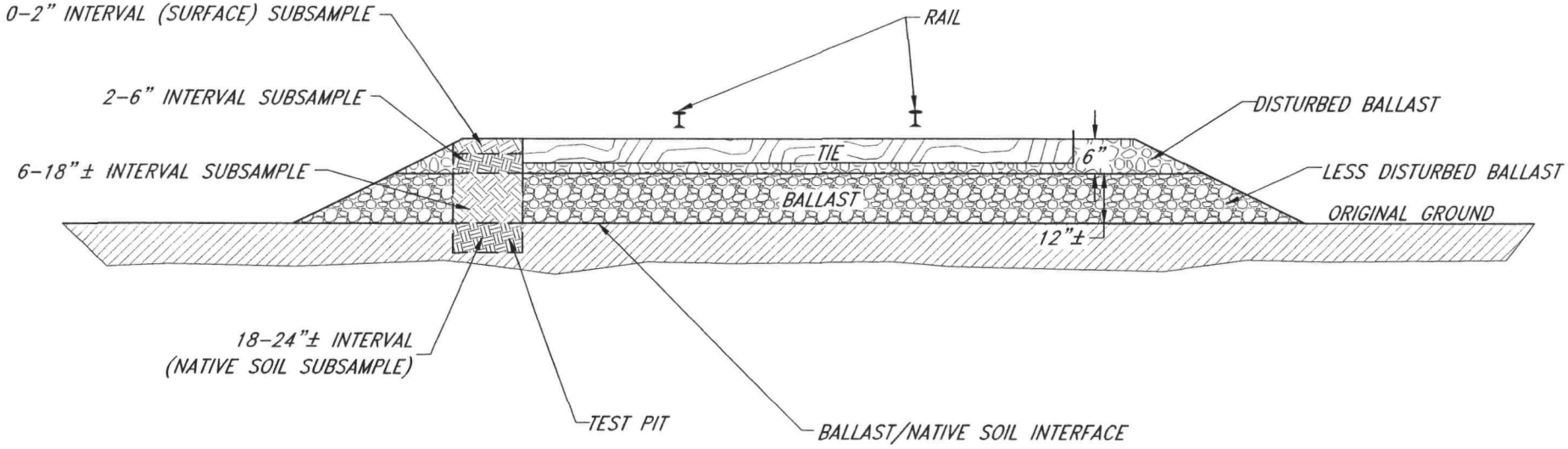


LEGEND

= TEST PIT/SAMPLE LOCATION

PIONEER TECHNICAL SERVICES, INC.

FIGURE 3
WEST VALLEY RAILROAD BED INVESTIGATION
PROPOSED TEST PIT LAYOUT
SCALE: N.T.S.
DATE: 3/27/03



PIONEER TECHNICAL SERVICES, INC.

FIGURE 4
WEST VALLEY RAILROAD BED INVESTIGATION
ANTICIPATED TEST PIT PROFILE
SCALE: N.T.S.
DATE: 3/28/03

RDUS-RES-RR-SAP104

TABLES

TABLE 1
West Valley Railroad Bed Investigation
Sample Location Identification

Sample Location ID	Feet of Track Covered	Test Pit Station Location	Test Pit Location - Side of RR Bed	Comments
WVRB-0	0-1500	0+00	North	
		5+00	South	
		10+00	North	
		15+00	South	
WVRB-20	2000-3500	20+00	North	
		25+00	South	
		30+00	North	
		35+00	South	
WVRB-40	4000-5500	40+00	North	
		45+00	South	
		50+00	North	
		55+00	South	
WVRB-60	6000-7500	60+00	North	
		65+00	South	
		70+00	North	
		75+00	South	
WVRB-80	8000-9500	80+00	North	
		85+00	South	
		90+00	North	
		95+00	South	
WVRB-95	9500-10500	95+00	North	Railroad Bed Adjacent to Mainline
		100+00	South	
		105+00	North	
WVRB-100	10000-11500	100+00	North	
		105+00	South	
		110+00	North	
		115+00	South	
WVRB-120	12000-13500	120+00	North	
		125+00	South	
		130+00	North	
		135+00	South	
WVRB-140	14000-15500	140+00	North	
		145+00	South	
		150+00	North	
		155+00	South	
WVRB-160	16000-17500	160+00	North	
		165+00	South	
		170+00	North	
		175+00	South	
WVRB-180	18000-19500	180+00	North	
		185+00	South	
		190+00	North	
		195+00	South	
WVRB-200	20000-21500	200+00	North	
		205+00	South	
		210+00	North	
		215+00	South	
WVRB-220	22000-23500	220+00	North	
		225+00	South	
		230+00	North	
		235+00	South	
WVRB-240	24000-25500	240+00	North	
		245+00	South	
		250+00	North	
		255+00	South	

TABLE 2
RISK-BASED SCREENING LEVELS FOR ARSENIC IN SOIL

Screening Level Based Carcinogenic Risk	Residential Scenario (mg/kg)		Agricultural Scenario (mg/kg)		Commercial Worker Scenario (mg/kg)		Recreational Dirt Biker Scenario (mg/kg)	
Carcinogenic Risk	**RME**	**CTE**	**RME**	**CTE**	**RME**	**CTE**	**RME**	**CTE**
$1x10^{-6}$	2.97	18.5	10.03	100.4	13.3	101.5	23.3	535.5
$1x10^{-5}$	29.7	185.2	100.3	1,003	133.0	1,015	232.3	5,355
$1x10^{-4}$	297.0	1,852	1,003	10,038	1,330	10,155	2,323	53,551
$1x10^{-3}$	2,970	18,516	10,030	10,038 5	13,300	101,54 6	23,231	53,551 7
Screening Level Based on Non-carcinogenic Effects	573.0	1,071	NC	NC	2,139	4,570	NC	NC

RME = REASONABLE MAXIMUM EXPOSURE, CTE = CENTRAL TENDENCY EXPOSURE, NC = NOT CALCULATED

mg/kg = milligrams per kilogram

TABLE 3: HUMAN HEALTH ARSENIC ACTION LEVELS

ACTION LEVEL	LAND USE
250 mg/kg	Residential
500 mg/kg	Commercial/industrial
1,000 mg/kg	Recreational/open space
2,500 mg/kg	Steep slope/open space

mg/kg – milligrams per kilogram

TABLE 4
WEST VALLEY RAILROAD BED
SAMPLE NUMBER SUMMARY

Sample Location	Sample Number	Sample Depth	Sample Type	Comments
WVRB-0	WVRB-0-0	0 to 2-inches	RR Embankment	
	WVRB-0-2	2 to 6-inches	RR Embankment	
	WVRB-0-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WvRB-0-NG	Original Ground 0-6"	Native Soil	
WVRB-20	WVRB-20-0	0 to 2-inches	RR Embankment	
	WVRB-20-2	2 to 6-inches	RR Embankment	
	WVRB-20-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-20-NG	Original Ground 0-6"	Native Soil	
WVRB-40	WVRB-40-0	0 to 2-inches	RR Embankment	
	WVRB-40-2	2 to 6-inches	RR Embankment	
	WVRB-40-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-40-NG	Original Ground 0-6"	Native Soil	
WVRB-60	WVRB-60-0	0 to 2-inches	RR Embankment	
	WVRB-60-2	2 to 6-inches	RR Embankment	
	WVRB-60-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-60-NG	Original Ground 0-6"	Native Soil	
WVRB-80	WVRB-80-0	0 to 2-inches	RR Embankment	
	WVRB-80-2	2 to 6-inches	RR Embankment	
	WVRB-80-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-80-8D	6 to 18-inches (+ or -)	Duplicate	To Native Soil Interface
	WVRB-80-NG	Original Ground 0-6"	Native Soil	
WVRB-B	WVRB-1-B	QA/QC	Blank	
WVRB-95	WVRB-95-0	0 to 2-inches	RR Embankment	Railroad Bed-
	WVRB-95-2	2 to 6-inches	RR Embankment	Adjacent to Main Line
	WVRB-95-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-95-NG	Original Ground 0-6"	Native Soil	
WVRB-100	WVRB-100-0	0 to 2-inches	RR Embankment	
	WVRB-100-2	2 to 6-inches	RR Embankment	
	WVRB-100-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-100-NG	Original Ground 0-6"	Native Soil	
WVRB-120	WVRB-120-0	0 to 2-inches	RR Embankment	
	WVRB-120-2	2 to 6-inches	RR Embankment	
	WVRB-120-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-120-NG	Original Ground 0-6"	Native Soil	
WVRB-140	WVRB-140-0	0 to 2-inches	RR Embankment	
	WVRB-140-2	2 to 6-inches	RR Embankment	
	WVRB-140-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-140-NG	Original Ground 0-6"	Native Soil	
WVRB-160	WVRB-160-0	0 to 2-inches	RR Embankment	
	WVRB-160-2	2 to 6-inches	RR Embankment	
	WVRB-160-2D	2 to 6-inches	Duplicate	
	WVRB-160-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-160-NG	Original Ground 0-6"	Native Soil	
WVRB-B	WVRB-2-B	QA/QC	Blank	
WVRB-180	WVRB-180-0	0 to 2-inches	RR Embankment	
	WVRB-180-2	2 to 6-inches	RR Embankment	
	WVRB-180-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-180-NG	Original Ground 0-6"	Native Soil	
WVRB-200	WVRB-200-0	0 to 2-inches	RR Embankment	
	WVRB-200-2	2 to 6-inches	RR Embankment	
	WVRB-200-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-200-NG	Original Ground 0-6"	Native Soil	
WVRB-220	WVRB-220-0	0 to 2-inches	RR Embankment	
	WVRB-220-2	2 to 6-inches	RR Embankment	
	WVRB-220-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-220-NG	Original Ground 0-6"	Native Soil	

TABLE 4
WEST VALLEY RAILROAD BED
SAMPLE NUMBER SUMMARY

Sample Location	Sample Number	Sample Depth	Sample Type	Comments
WVRB-240	WVRB-240-0	0 to 2-inches	RR Embankment	
	WVRB-240-0D	0 to 2-inches	Duplicate	
	WVRB-240-2	2 to 6-inches	RR Embankment	
	WVRB-240-8	6 to 18-inches (+ or -)	RR Embankment	To Native Soil Interface
	WVRB-240-NG	Original Ground 0-6"	Native Soil	
WVRB-B	WVRB-3-B	QA/QC	Blank	

All samples will be analyzed for total arsenic via XRF Spectroscopy.

Table 5
Equipment Required for Test Pit Sampling

Equipment	1st Check	Car Check	Notes
WASTE MATERIAL AND SOIL			
Logbook			
Tape Measure			
Sample Containers-70			
Scoops -65			
Disposible Aluminum Pans -60			
Stakes			
Camera			
DI Bottle			
DI Carboy			
Shovel			
GPS			
MISC EQUIPMENT			
COC Forms			
Labels			
Clear Tape			
Parafilm			
Sharpies			
Pens			
Garbage Bags			
Paper Towels			
Duct Tape			
Gloves			
Coolers			
SAP			
COC Seals			
PPE			

APPENDIX C

FIELD LOG COPIES

~~TTHR~~ WE-A

7/28/03

0700 Arrive @ site for pre-job

John Mike Dowrey
Julie Flamming
Shaw Rsch
} PTS

Ken Brockman - EPA Contractor

Tom Mulligan - Jordan (Backhoe)

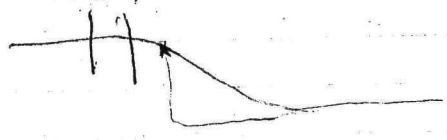
Sunny, 60-80s, slt breeze

0755

~~0800~~ Begin digging WVRB-0 north side of track ~~1/~~50' from end of track

0845 - West End Spur Area

WVRB-WE-A



0-2' - med gray silt w/ pebbles 40% - angular pebbles <1"

2'-2.5' - med brown silt w/roots 5-10% pebbles <1"

2.5-2.8' med gray/yellow silt w/pebbles 40-50% between 1-2"

Depth to Natl Ground varies from 2'-3', 6'-2'

0911 WVRB-WE-B

0-2'6" - Embankment material

0-1.6' - med gray silt w/50% pebbles <1" - to angular

1.6-2.6 med gray brown silt w/clay slightly larger pebbles <1 1/2" - lenses of more clayey dk brown silt

2.6'-2.8' - med dk brown clayey silt few pebbles

2.8-3.0 - med brown silty (loam) w/ few pebbles

WE-C

30-35° med brown silt w/a little clay 30-40% pebbles <2"

WVRB-WE-0
WVRB-WE-2
WVRB-WE-8
WVRB-WE-NG

} 0935 Composite of WVRB-WE A→B

K. Brockman requested these 2 be a seperate composite. The area was a storage area & railroad bed was more built up - The 3rd hole adjacent to road is flatter & on edge of reclaimed area, that will be a seperate opportunistic sample.
Next hole (opportunistic sample) 375' east of WVRB-WE-B.

0945- Begin sampling
WVRB-WE-C-2nd
Collect WVRB-WE-C-0 (0-2")
WVRB-WE-C-2 (2-6")
& ~~WVRB-WE-C-B (6-)~~
WVRB-WE-C-NG (NG 0.6)

Collected as a single pit sample per request of K. Brockman

flat profile

1.1' of silt below tracks to native ground

Small layer of gravel on top

0-.5- lt gray silt w/pebbles <1+2" big 50-60% @2

.5-1.1'- med brown silty w/some clay 40% pebbles <3" 2.6

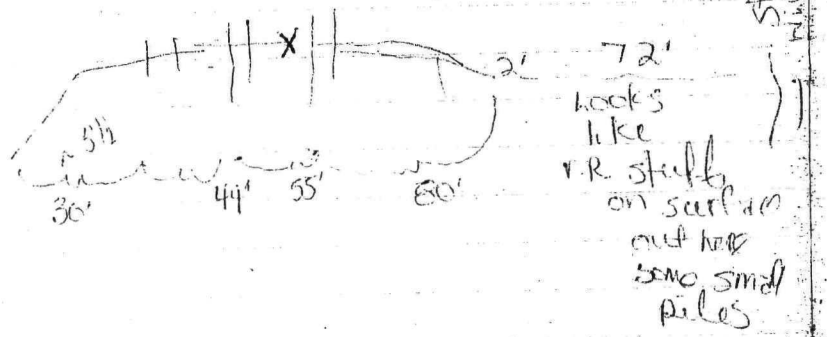
1.1-1.5 Dk brown loamy clay w/pebbles 20-30% - Native Ground NG

1.5-2.0' lt gray silt w/pebbles 50% <2"

1016- Move WVRB-WE-D
Single pit per K. Brockman request

$\frac{2\frac{1}{2}}{1\frac{1}{2}}$ WE-$\frac{14}{4}$D

In the area where 3 tracks are adjacent to each other



1035- WVRB-WE-D-0 - 0-2"
WVRB-WE-D-2 2-6"
WVRB-WE-D-8 6"-2.4"
WVRB-WE-D-NG (2.4-2.9'
WVRB-WE-D-12-(12-18")

0-1'- med gray silt w/ pebbles <1" 50%

1-1.5- Dk black silt w/ rock (cinders very light, no cinders

1.5-2.4- med gray silt w/ pebbles <2" 40%

2.4-2.6- Dk Dk brown loam w/ few pebbles

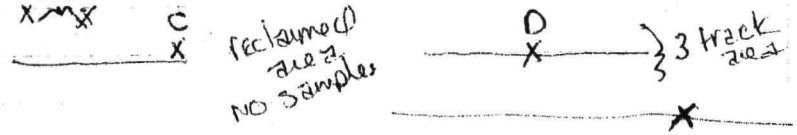
2.6-3.3- med brown silt w/ large pebbles w/ large rock rounded up to 12" - 30% rock

K. Blackman requested a sample of cinders layer separately

Took 3 pictures

The 3 track area appears to be a spur line to the limestone cliffs-

Actual railroad is parallel to Highway 1 & south of the 3 spur area



1110 - Dig hole by south Adjacent (North of fence by power pole 45 51

O-A

TD on hole is 2.4'

0-3" was lt gray silt w/pebbles

3"-8"- blk slag looking material

9"- Nat'l Grd-

NO ties in this drive on this hole so F

Hole was approximately 4' N of fence & 15' south of tracks - extending hole towards tracks

Did not sample this hole

2 tracks in this area - silt rise 1½-2'

1130- Begin digging a hole approx 300' from last hole -

Track is single here w/ pretty high embankement just past cattle guard

This will be WVRB-O-A

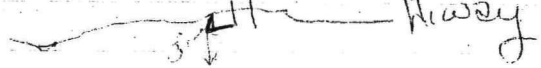
see p. 9

OA ; O-B

WVRB-O-B

1:45 - Begin digging hole on N side ~ 500' from last hole

North side looks like it has more fill on it



Hole is 40' west of 1st driveway coming this way from quarry

Can see in hole that it looks like black material was put down on nat'l ground & then ties set on that

In hole can see where it pelers out approx 3' from track

see page 10

F

~~WVRB-O-A~~ WVRB-O-A picture #62

TD = 3.2

0-2"- med gray silt w/pebbles will be composite for O

.2'-.8' blk coarse grained material w/ some rocks will be composited for 2

.8-1.3- mod ~~grained~~ F silt w/ cobble

O-B-

up to 3" - 60% rounded
will be composited for 8

1.3-1.8' med brown silty loam w/ few rocks - will be composited for NG
natural ground -

1.8'-3.2' - med brown gray silt w/ cobbles up to 6-8" - 50%

WVRB-O TD= 2.3 pictured

O-.3'- med gray silt w/ pebbles < 1" will be composited for O

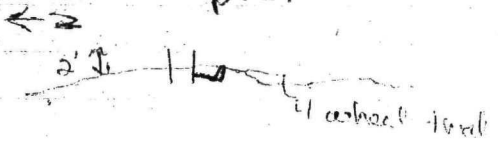
.3-1' blk coarse grained material not a straight line undulates between ties & below
will be composited for 2

1'-2.3 med brown silty loam few pebbles/rocks
will be composited for NG

NO 8 composite in this hole

O-C

'25 WVRB-O-C TD-2.3
photo #60



O-.3 med gray silt w/ pebbles <1" 50-60%

.3-1'- dk blk coarse grained stuff w/ few rocks looks like undulates

1'-2.3 med brown ~~clayey~~ silty loam w/ 20% rocks up to 6"

South side of hole - 2" layer of slag below 0.3 3-5" slag material

On north side of tracks trench was dug - 14' long rail to end of pit - 1.-1.2' blk coarse grained materia

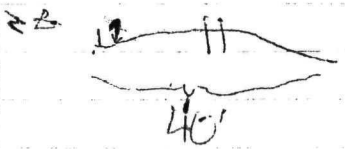
On south side trench - tracks 13' out 6" of material overlying NG - 1/2 gray silt, 1/2 blk material

15-A

1310 WVRB-0-0 composite of A,B,C 0-3"

WR-WVRB-0-2 composite of A,B,C
All coarse grained blk material
var ranges from .2-1'
WVRB-0-8 - example from A
.8-1.3' material underlying blk material (fill)
WVRB-0-NG composite of A,B,C
native soils

1345 WVRB-15-A TD-1.5
picture 59
on north side of track



0-.2 - lt gray silt w/pebbles

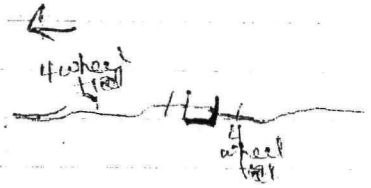
.3-.7 - coarser grained blk material w/ red/orange stained areas

.7-1.5 med brown silty loam w/ some cobbles

15-B

on north side of pit there is no coarse blk material - surficial stuff.

1407 WVRB-15-B TD-1.8'
picture 58



0-.2' - lt gray silt w/pebbles - 50% <1"

.2-1' coarser grained dk material w reddish orange staining

1'-1.8' - med brown silty loam with some lighter pockets few rocks 10% < 3" - native soils are light

1.8' - large rounded rocks up to 12'

On south side of pit - gray silt on native soils

15-C

1402 - Scratch hole south of WVRB-15-B to see what black stuff is per K Brackman

TD = 2.3

0-.2 - gray silt w/ pebbles

.2-1' - gray silt w/ large cobbles < 6" 30%

1'-2' - coarser blk material some locks fused w/ some cobbles

2'-2.3' Native ground med brown silt loam w/rocks

25' from tracks to edge of pit approx 200' long on surface - possible old skidding

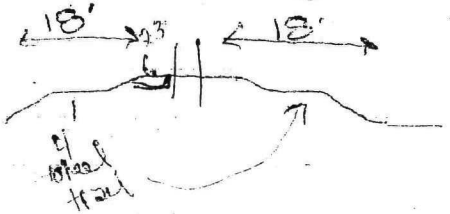
1450 - WVRB-15-C
TD = 2.3' Photo #56'

0-3' silt w/pebbles very well developed root mass

.3-.7 - blk coarse grained material pebbles <1' 40%

.7-2.3 med brown silty loam w/ rocks up to 6" 10% very tight

north side of ditch no coarse material only silt - 3'



1500 WVRB-15-C composite of A,B,C
0-.3' gray silt w/pebbles
WVRB-15-2 composite of A,B,C
.3-1' blk organic material
~~for~~ WVRB-15-NG composite of A,B,C
~.7-2.3' native ground

1510 WVRB-30-A south side of tracks in trees
TD = 1.5' photo = 55

30A, 30-B

WVRB-30-A

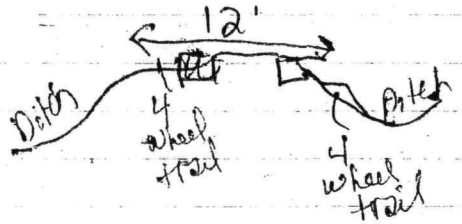
0-.3 - med gray silt w/ pebbles <50% >1"

.3-1.1 - coarse grained blk material

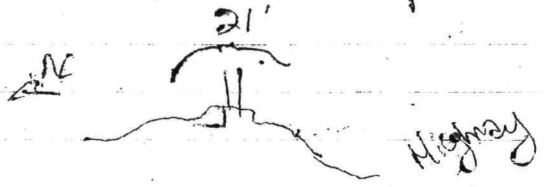
1.1-1.5' - med brown silty loam

roots throughout profile -

south side of pit 0-.3 of silt on native grd



1540 WVRB-30-B
north side of track
TD = 2' photo 54



lots of roots throughout profile

0-.4 med gray silt w/ pebbles <1" >80%

.4-1.5 coarse grained blk material some pebbles

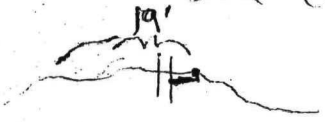
1.5-1.7 - lt tan silt, hard pack sampled as NG

1.7-1: med brown hard pack silty loam w/ few rocks & pebbles

N side of pit 0-.3' is gray silt on top of lt tan silt

1557 WVRB-30-C
TD 2.2 photo 53

south side of tracks



0-.2' gray silt

.2-1' to 1.4' dk blk coarse material

30 C, 45 A

1 to 1.4' - 4,9" coarse grained red orange red & small pebbles
1.9-2.2 Blk clayey loam w/ rocks
~ no rocks

South side of pit
0-2 silt gray
.2-1' - dk coarse grained material w/ some orange coarse material
1- dk blk ~~coarse grained material~~ clayey loam

1616 - gray silt WVRB-30-C composite of A,B,C.
Blk colour WVRB-30-2 composite of A,B,C.
red color * WVRB-~~45~~ 8 - single sample from C
native ground WVRB-30-NG composite of A,B,C

1635 Arrive @ WVRB-45-A
TD = 3' Photo: 52

0-1.5 - med gray silt w/ pebbles < 1" 50-60%. Pockets of dk coarse grained material ~~kind of~~
1.5-1.9 - coarse grained dk material

w/ pockets of coarse red sand

1.9-2.9 - dk blk loamy material very moist w/ lots of organics

2.9-3.0 - organic rich brown moist silt - looks almost peaty

North side of pit

0.9 - grey silt
.9-1.9 dk coarse material mixed w/ blk silt - wet
1.9-2.4 Peaty material

1722 off site for day

sampled 0-2"
2-6"
6"-1.9'
1.9-2.3' NG

45-B 7/29/0_

B/C Sampling

0700 Arrive on site
K Brickman } EPA contractor
J. Flannmany }
J. M Deeney } Pinner
T. Nuggins } KI

T Nuggins takes backhoe to 1st site

Safety Mtg: Careful on edges of holes in case of collapse
Getting in & out of holes
Bees & Bugs
No steep bank on tracks
telecommunication line
aware of people on track

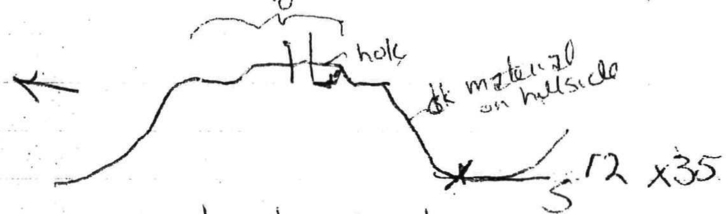
0745 - WVRB-45-B
TD = 1.5 photo 51, 50
hole on S side
0 - .6' - lt gray silt w/pebbles <1" <50%

.6 - 1' - Dk colored med to coarse grained material w/pebbles

1 - 1.2' - lt tan coarse grained material

1.2' - 1.5' med brown silt w/rocks up to 6" 40%-50%

For composite: 0-.2'
.2-.6'
.6-1.2
1.2-1.5



may be dump site
12 x 35 area of uneven coarse material at base of r.r. embankment
Dug hole 1.4' deep in middle to a foot on edges
Creek crosses 75-100' west of hole

840 - WVRB-45-C
TD - 2.2' photo #49
north side of hole
0 - .7' med gray silt w/pebbles 50-60% <1"

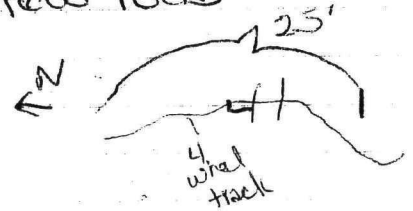
45-C

.7-1.0- Dk black med-coarse material
pebbles <1"

1.0-1.7'- Dk black med-coarse material
w/ pockets of orange material
med-coarse grain
pebbles in all <1". 70%

1.7-1.9- med grained lt brown to
tan sand - no rocks

1.9-2.2 med red brown silty loam
few rocks -



904- WVRB-45-0 composite A,B,C 0-2"
WVRB-45-2 composite A,B,C 2-6"
WVRB-45-8 composite A,B,C Dk material
* WVRB-45-8D " "
WVRB-45-NG " composite of A,B,C native ground

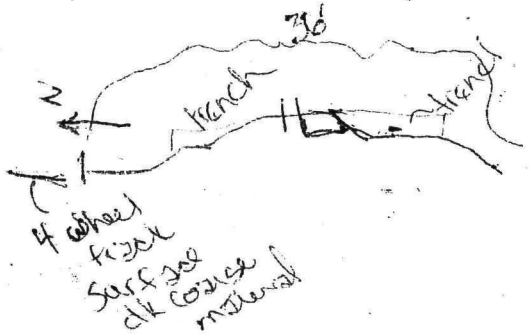
60-A

445 WVRB-60-A
TD-4.7 photo #48
Hole on south side
0.1 - large gravel <3" 100% not sampled
~~1.1 - #~~
.1'-.3 - med gray silt w/pebbles
<1" 50 60% sampled as 02
.3-1.1' med grained dk material
pebbles <1" 50 60% sampled as 2b

1.1-2.0' coarser grained dk black material
some pebbles <1" 40%

2.0'-4.6'- dk red brown clayey loam sampled as NG
some areas are redder (dark)

4.6-4.7- med brown clayey silt
w/ rocks 6-12"



Thin was an unusually wide area of visible dk material

60-A

trench on south side - 13½' long
photo # 47

north end 0-.3' lt gray silt. lots of roots
.3-.9 - dk coarse material
.9-3.4 - dk red brown clayey loam

south end 0-.6 - lt gray silt
.6-1.3 - dk coarse material
1.3-2.4 dk red brown clayey loam

~~North~~ Trench on north side
photo # 46

~~south~~ end - 0-.6 lt gray silt
.6-1.3 - dk coarser material similar to 06 in main trench
1.3-3.2 - dk red brown clayey

North end.
0-.3 - lt gray silt roots
.3-.9 - dk coarse material
.9-1.6 - dk red brown clayey silt
dk material is petering off quickly not much beyond profile here

4 wheel track adjacent to trench

60-B

has surficial covering of dk med grained material - Deer scratches

10:26 - Arrive @ WURB-60-B
by pole 458°

TD = 2.8'
photo # 45
north side of tracts

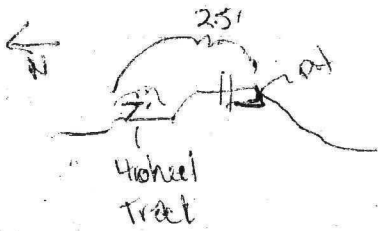
0-.5 lt gray silt w/ pebbles
lots of grass on it 0-2
.5-1' - med grained ~~coarse~~ black material
pebbles <1". 2-6

1'-2.6 - coarse grained black material w/ pebbles <2" - 40% 6-18
pockets of coarse red-orange rocky material near bottom
2.6-2.8 med brown silty loam w/ pebbles <3' <10% roots NG

North side of pit TD = 1.2
0-.5 - lt gray
.5-1.0 - dk material
1.0 NG

60-C

1102 WVRB-60-C



TD = 2.2 photo #44
South side of traces

0-1" - small amount of gravel on top <3".

1"-.1 - lt gray silt w/ pebbles <1" - 50-60%

.1-.8 - med grained blk to dk gray material pebbles <1" - 50-60%

.8-1.4' - coarser grained blk material rocks <2" occasional larger 60%

1.4-1.6 coarse grained red orange material rocks <3"
in places layer is larger & smaller

1.6-2.2 - med brown silt loam w/ rocks
some rocks

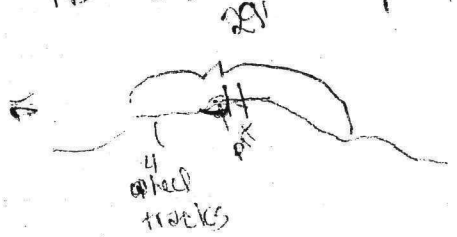
75-A

south side of hole
no blk material - 3" root zone
then gray silt 6" - then N.G.

1110 WVRB-60-0 composite A, B, C 0-2"
med grained blk WVRB-60-2 " " "
coarse grained blk WVRB-60-8 " " "
med brown silt loam WVRB-60-NG " " "

4 wheel drive trail has blk med grained material - dusty.

1124 Arrive @ WVRB-75-A
north side of tracks
TD = 2.2' photo # 43, 42



0-.4 - lt gray silt w/ pebbles <1" 50-60% sampled 0-2

.4-.9 - med grained blk material rocks <2" 40% sampled 2-6

75-A, 75-B

.9-1.3 - coarser blk material w/ packet of reddish orange very coarse material rocks <3" - 30-40% sampled for L-15

1.3-2.2 med brown silt w/ few rocks - sampled for NG

north side of hole TD- 1'
0-.5 - lt gray silt
.5-.7 - blk material
.7-1.0 N.G

1150 Arrive @ WURB-75-B
Adjacent to Mountain View Rd
TD= 2.4' photo 41
south side of tracks

0-.2 lt grey silt w/ pebbles 50-60% <1" sampled as 0-.2

.2-.7 med grained blk material pebbles <1" 30% sampled as .2-.6

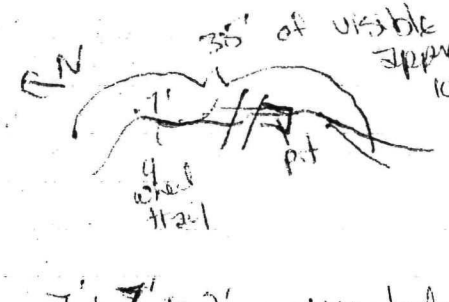
.7-1.8 coarser grained blk material rocks < 2" 50-60% with pockets

75-B, 75-C

of coarse grained red orange material

1.8-2.4' med brown silt loam w/ few rocks

West end of pit
0-.3' lt gray
.3-.6 blk material
.6- brown silty loam



7'+7'+2' unvegetated

1215 Arrive @ WURB-75-C.
north side of track
TD= 2.4' photo # 40

0-.8 - lt grey silt w/ pebbles collected as 02

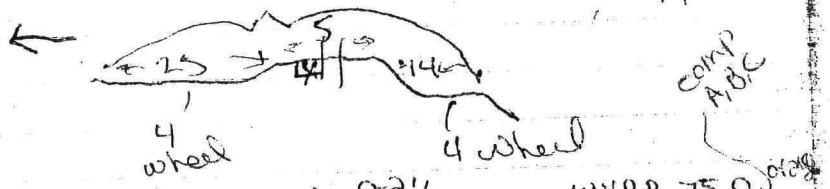
75,C,90A

0-.7 : coarse grained blk material
Sdy

.7-1' - reddish brown coarse grained
some med grained sand can
see where orange brown extends
down into native soil — orange

1-24 med brown silty loam w/rocks
<6" - 20%

Bath side of pit
0-.6- lt gray silt
.6 NG



1230 WVRB-75-0 0-2" comp A,B,C WVRB-75-B
WVRB-75-2 Blk material WVRB-75-NG-NV

1241 Arrive @ WVRB-90-A
TD- 1.9' photo# 39
South side of tracks

waste material goes about .3'

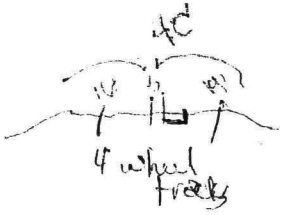
90-A, 90-B

below ties & then goes up between
LL LL

0-.2' - lt gray silt w/pebbles <1" -
50-60% sampled as 0-.2

Between ties
.2-.6 (& .3' below ties) blk coarse grained material w/ red brown coarse sand sampled as

.6-1.9' med brown silty loam w/
rocks <6" 20%? sampled as N-6



South side of pit has .1' layer blk coarse underneath a 3-4" layer of root mass

1300 Arrive @ WVRB-90-B
TD- 1.2' photo# 38
north side of road

95-B, 95 B

0-.3 lt gray silt w/pebbles

.3-.8 med grained red brown w/ orange tinge some <1" pebbles 30%

.8-1.2 med brown silty loam w/ a few rocks 38' non veg

north side of pit TD=.9

0-.3- lt gray silt
.3-.6- mix of orange red sand & med gray silt
.6- NG

1340 Arrive @ LOVRB-95-B surface area is red here-dual railroad tracks in this sketch- No tracks present here at this time-

Boulders (rocks) < 18" many have ~~to 18"~~

95-B

2 blue coating on item @ base of hole 3.2' bgs
photo # 36, 37

TD on hole 3.7'

0-.4 fine grained silt few pebbles 10%

.4-1.5- coarse grained red sand very hard almost like it was concrete

1.5-2.3- looser coarse grained red sand

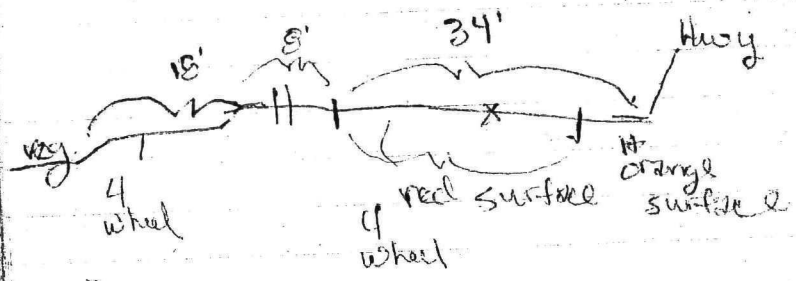
2.3-2.6 med brown silty loam few rocks

2.6-3.7 med brown silt w/ large rocks > 16" from 3.2 to base

3.2-3.7- North side of pit has higher percentage of rocks w/ blue/green coating

95-B, 95-A

WVRB-95-B cont photo 35



1410 WVRB-95-A
TD- photo # 34 ?

pit shows change from one line to other line

north side of pit
TD 25'

0-.7' reddish orange fg silt getting coarser & more pebbles towards bottom

.7-1.6 coarse grained blk sand w/pockets of orange red

95-A

1.6 ~~2.5~~ 1.9 med brown silty loam
1.9-2.5 med brown silt w/ rocks <12"

south side of pit

0-.1' fine grained silt orange red

.1-1' coarse grained orange sand w/ ~~pebb~~ rocks <6" - concreted together very hard to sample

1-1.3 med brown silty loam few rocks

1.3-2.3 med brown silty loam w/ rocks <8" some w/ blue staining

Appears to change SE corner of pit - 12' from south track of in place railroad from north track bed to other track beds

lots of dust generated by 4 wheels going by

90-C

1445 WVRB-90-C
TD = 1.9' photo # 333
south side of tracks

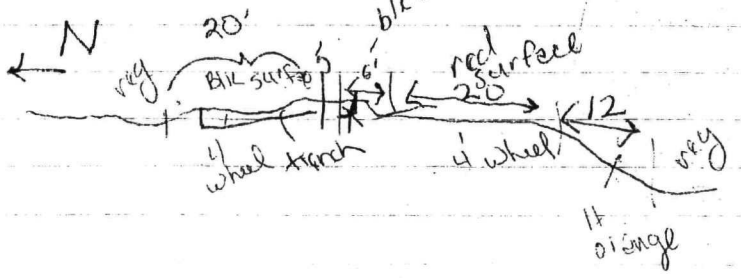
0-.3 gray silt w/ pebbles

.3-.6 med grained blk sand w/ some pebbles

.6-.9 coarser grained black sand w/ some pebble

.9-1.9' - med brown silty loam very few rocks

south face
0-.3' is silt w/ lots of roots
.3-.5 - orangish red coarse very loose sand



90-C, samples

trench on north side 1.4'

south end about 1" layer of orange blk mixed below 3" of roots/grass

middle by 4 wheel track
0-.2 dk gray fg silt w/ pebbles

.2-.7 coarse grained blk sand
.7- NG

N end of trench - 3' from veg

0-.1 - dk gray silt w/ pebbles
.1-.3 coarse grained orange sand
.3-.7 - dk coarse grained sand
.7 - NG

1500 WVRB-90-0 0-2" composite of A, B, C
WVRB-90-2 composite of B, C & blk
WVRB-90-NG composite of NG

95-C

1540- WVRB-95-C
TD- 2.8' photo # 32 ?

0-.4- f.g orange red silt w/some pebbles

.4-1.7- coarse grained orange red sand

1.7-2.2 dk brown silty loam w/ few rocks

2.2-2.8' - ~~dk~~ med brown silt loam w/ rocks < 6"

south side of pit
0-.1- red silt
.1-1.5 - orange sand
1.5 - N.G

1550 WVRB-95-O 0-2" red silt A, B, C
WVRB-95-OD 0-2" A, B, C red silt
orange sand WVRB-95-2 2- Depth A, B, C composite
native soil WVRB-95-NG

105-A

Same measurements & profile as B

1540 K. Brockman - EPA
C. Coleman + EPA
Brian Barcoyial - DEQ
+ tom Routt - ?

on site to look @ holes

1550- Above leave site

1600- Move to WVRB-105-A
TD: 1.6' photo # 29
north side of tracks

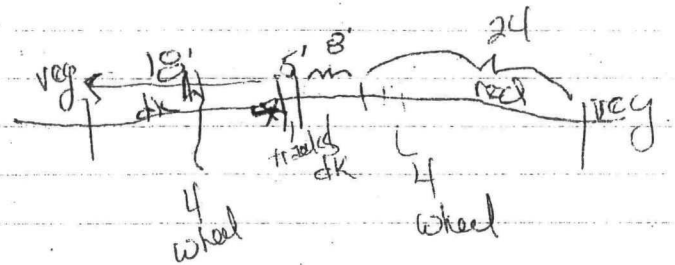
0-.4' - lt gay silt w/pebbles <1" >50% some roots sampled as 0-2"

.4-.8'- coarse med grained dk sand sampled as 2-18"

.8-1.6' - med brown silty loam w/few rocks sampled as NG

105-A, Blanks B-1, B-2

North side
0-2' - roots, gras
.2-.4 silt
.4- NG



1600 Joe Jordan on site
1625 - Joe Jordan off site

0800 WVRB-1-B
1200 WVRB-2-B

Blanks were created by scooping silica sand into ziplock bag with a disposible scoop

1635 - off site for the day

2 105-B

Sampling 7/30/03

0700 Arrive @ ~~site~~ J Jordan Office

J.M Downey ⟩ Pioneer
J. Flammang ⟩
T. Wiggins ⟩ JCI
sunny, windy, 50 97°
0712 - Move to 1st sample site

Safety mtg: gas lines during lateral digs
Water - 97° today

J.M Downey measures from Theatre Lane to edge of 2nd railroad bed - 60' east of road

0800 Begin digging WVRB-105-B
TD - 1.5' photo # 28
pit is on south side
0 - .3 - lt gray silt w/ pebbles <1" 30-40%
lots of dried veg on top not

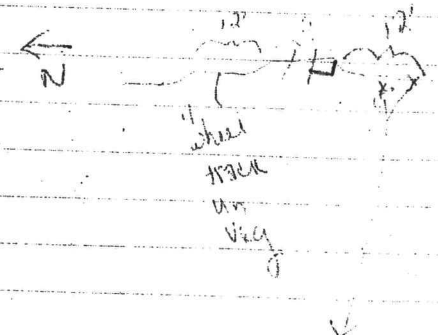
12-N 105-B 3

much roots. sampled as 0-2.

.3 - 1 - med grained blk sand grading to coarser closer to 1' pebbles <1" 20-30%
pockets of coarse grained orange red sand 1-3% sampled as 2-6".

1 - 1.5 med brown silty loam w/ some rocks <1"

south side of pit
surface skim of lt gray silt then NG



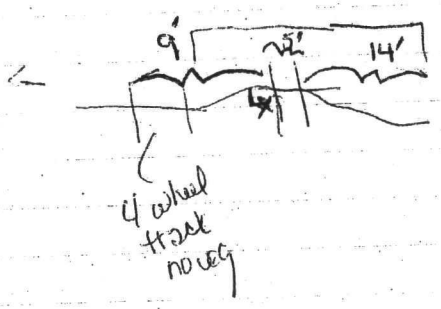
veg to everything else veg except small patch adjacent to pit

small area adjacent (south) of pit has coarse orange red red sands in it - thin layer @ 2-10 inches bgs variable width 2-3" then native

105-C

trench on north side in 4 wheel drive track -
6" of fill on south side of trench
0" on North side - treen edge of 4-wheel track

0825 WVRB-105-C
TD= 1.8' photo 27
north side of tracks



0-.3' - lt gray silt w/pebbles <1"
40-50% 1/3 of dead veg on top
sampled as 0-2

.3-.8' coarse grained red ~~brown~~ orange sand - some very hard pack sampled as 2-4

.8-1.3 coarse grained blk sand - very loose
sampled as 2-4

1.3- med brown silty loam w/rock <6"
20% sampled as N-G

120-A

north wall of pit

0-.3 lt gray silt w/very good roots
.3-.7- lt gray silt
.7- NG

0840 gray silt WVRB-105-0 composite A, B, C
blk/red WVRB-105-2 " "
native WVRB-105-NG " "

0900 - WVRB-120-A
TD= 1.8' photo 26
south side of track

0-.3- lt gray silt w/pebbles
<1" - 40% sampled as A

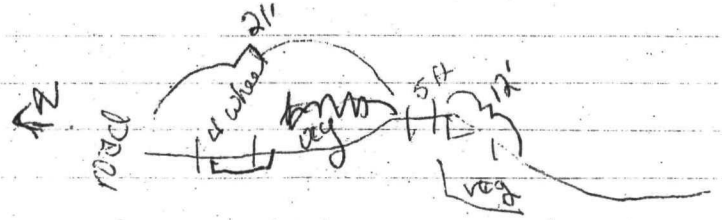
.3-1.2'- orange red coarse sand towards top of layer - some clumps like of cement

1.2-1.8'- med brown silt w rocks <8"
20% - a small layer of lt tan silt few rocks

120-A

South side of pit - can't see trench on south side - 9' long extending S of tracks
N end 1.3 TD
0-.4 lt gray silt
.4-1.2 - orange sand
1.2 NS
S end of trench (4' S of previous profile)
Native soil

trench on N. side of tracts across 4 wheel tracks 6
S. end TD = 1.4
0-.2- red silt
.2-.9- coarse → med gr. orange sand
.9-1.4 N.G
N end of trench (3' N) TD = 1.3'
0-.5 lt gray orange silt good root mass
.5-.9- orange sand
.9-1.4 - med brown silt



120-B

0920 - Ed McCarthy on site to double check GPS line locations

0930 E McCarthy off site

0945- WVRB-120-B
TD = 1.8' photo 25
north side of tracts

0-.3- lt gray silt w/ pebbles <1" ~40%

.3-1 med orange coarse to med grained sand w some small concretia near top. Some blue/green staining on rocks in layer

1'-1.5- med brown silt few rocks <3"

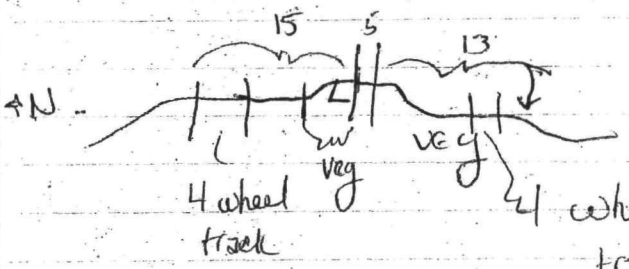
1.5-1.8 med brown silt more & larger rocks <16"

north side of pit appears to be native sub

120-B, 120-C

This stretch has (in general) from this morning

N grass, 4 wheel track (unveg) looks like blk coarse grained material which produces lots of dust, a few fet of veg to ties then unveg track then veg from ties down other side of embankment

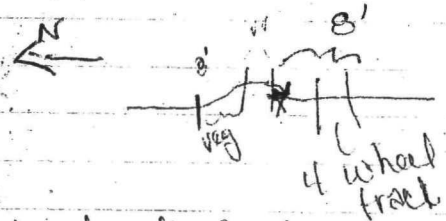


1010 WVRB-120-C
TD 1.9 photo# 24
South side of trail

0-.3 lt gray silt w/pebbles roots sampled as 0-2"
.3-.9 coarse grained dk orange brown sand w/ rocks <3" sampled as 2-6
.9-1.9 med brown silt w/ rocks <4" + roots sampled as NG

1020 WVRB-120-C 0-2 comp of A,B,C
120-C WVRB-120-2 comp of A,B,C orange
135-A WVRB-120-NG " " Native
South side of pit

0-.6 lt gray silt brown
.6-.9 mix of silt & coarse blk sand
.9-1.6 brown silt

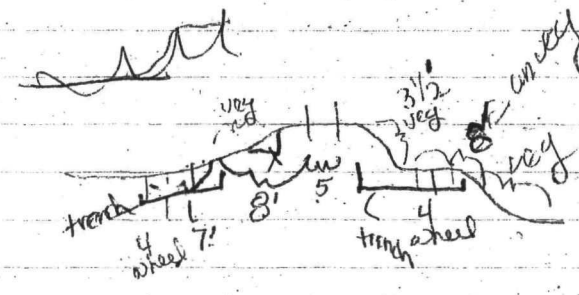


veg between track & rr & outside of track

4 wheel track on north side ends @ driveway just w of hole

1035 WVRB-135-A
~~Pit~~ At street just west of here 4 wheel trail resumes on both side of tracks → well vegetated strip on embankment between rails & 4 wheel trail
- surface expression of red silt streaks about 1/2 way between here & street west on 4 wheel trails

r.r tracks surface expression gray/black
4 wheel tracks - surface expression - orange
S. side is redder than north, dusty



WVRB-135-A
TD 1.9' Photo #23 (of south trench showing orange sand)
north side of tracks

0-.5 med gray silt w/veg & roots
lots of pebbles <1" 40-50%
collected as 0-2

.5-1.2 - med to coarse grained sand ~~in to~~ in some places
blk coarse grained sand last 6"
collected as 2-6

layer of blue-green staining below orange sand ~ native soil coating rocks & roots- ~~collected as NG~~
Roots present throughout profile

1.2-1.9 lt tan silt w/rocks < 12"
collected as NG

trenches dug on both sides in 4 wheel tracks

South trench

N end
0-.6 orange red silt w/pebbles
.6-1.3 - coarse grained orange sand
blue/green stain layer @ base of sand
blue/green staining on rocks within layer
rocks in layer < 8" - 20%
1.3 lt tan silt w/rocks

S. end TD = 2.6
0-.7 - lt orange red silt
.7-1.8 - coarse grained orange sand
blue/green stain
1.8-2.6 NG - lt tan silt

North trench
0-.3 - lt red silt south end
.3-2.1 - coarse red sand - concretia
blue green layer @ base
2.1 - lt tan silt w/cobbles

135-A

South end North trench
for side of 4-wheel track
TD= 2.1

0-.8 - lt gray silt w/pebbles
.8-2 - coarse orange red sand
no noticible staining
2-2.1 - dk brown silty loam

1115 WVRB-135A-0
collected as opportunistic 0-2" sample from the 4 wheel tracks
1/2 of sample from each track on either side of rails

1120 WVRB-135A-2
collected as opportunistic 2"-2' sample from coarse orange sand underlying the 4 wheel tracks. Composite sample w/1/2 of ~~each~~ sample collected from each track on either side of the rails -

Will consult w/PM before submitting for Analysis

135-B

wetland vegetation (snake grass)

1150 WVRB-135-B
TD= 1.8 photo # 22
South side of tracks

0-.2' - lt gray silt w/pebbles <1" 40-50% sampled as 0-2"

.2-1' - orange red coarse grained sand w/pebbles <2" 30% sampled as 2"-6"

1'-1.8 med brown silt loam w/few rocks no staining @ interface sampled as NC

Trench on south side middle of pit TD= 3.6"
0-.2 fine grained red silt
.2-2.5 - coarse orange sand w/
2' - large concretes
2.5-3.6' med brown silt loam w/ver few rocks

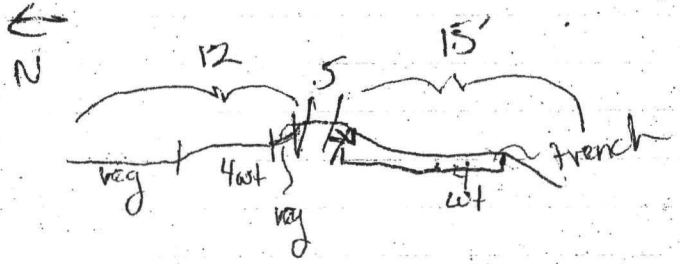
profile in trench is 8' from rail

Tom Routt

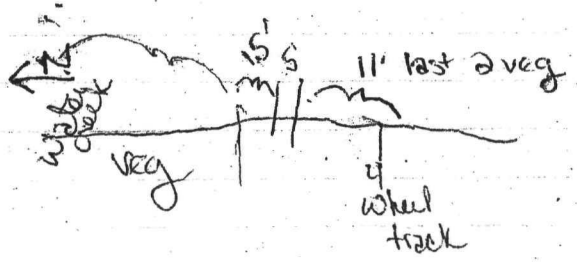
15'-S
12-N

135-B, 135-C

WVRB-135-B



WVRB-135-C



TD = 2.0' photo #. 21
north side of tracks

0-.2 lt gray silt material w/pebble <1" 40-50% sampled as 0-2"

.2-.8' very dk orange red coarse sand w/ few rocks } 0-6"

.8-1.4 med orange brown coarse grained sands some rocks

1.4-20 dk brown stagey slt loam. some patches of lt tan clay rocks present sampled as NG

1240 0-2" WVRB-135-0 composite A,B,C
.2-1.4' WVRB-135-2 " "
native soil WVRB-135-NG " "

Trench on south side - 7' long

N end · TD 2.3'
0-.3 lt red silt layer of blue/green staining @ base of sltl
.3-1.3' orange sand - coarse concretes
1.3- Dk brown/~~blue~~ silty ~~clay~~ base

S end of pit TD = 1.4'
0-.3 - lt gray silt
.3-.6 - f-g orange red silt
.6- dk brown silty loam few rocks

1250 - K Brockman arrives on site

150-A

1300 WVRB-150-A
TD 2.5' photo 20
south side of tracks

0-.7 - lt gray silt w/ pebbles <1"
40% sampled as 0-2
some silt naturally goes under this here ↓ as 2-12

.7-1.3 lt orange coarse grained sand <1" 30-40% sampled as 2-12"

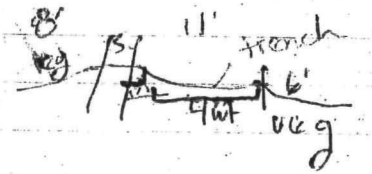
1.3-2.1 - coarse grained blk sand pebbles <1", 50-60%
some blue green staining towards base

2.1-2.5 dk brown clayey loam
some dk reddish streaks

~~south west corner of pit~~ S'
trench on south side - south end
TD-2.2 0-.5- lt grey silt
.5-1.1 - coarse blk sand ~~to~~ S' blue/green staining along base - in part white staining at base on south end
1.1-2.1 - coarse orange sand

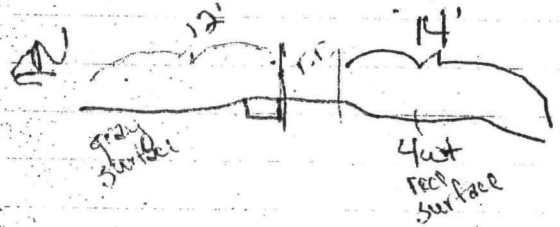
150-B

WVRB-150-A 30'



1333- K Brockman off site

1335 - WVRB-150-B



TD= 23' photo # 19
north side of tracks

0-.4 lt grey silt w/ pebbles <1"
40-50% sampled as 0-2
goes under ties again
.4-.6 - dk brown med grained sand pebbles <1" 20% sampled as 2-
.6-1.2- above mixed w/ orange brown coarse sand sampled as 2

150-B

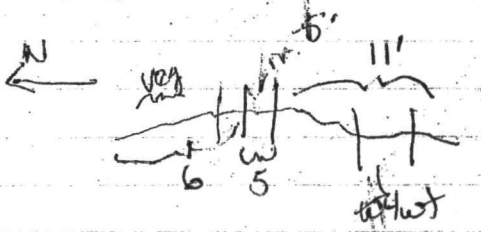
1.2-1.5 dk coarse grained sand pebbles (also blk) <1"

1.5-1.9 lt tan coarse grained sand no rocks

1.9- dk brown silty loam no rocks some brick red streaks

north side of pit
0-.4 grey silt
.4-.8 orange sand
.8-1.9 dk brown silt

1405 WVRB-150-C



TD= 28' photo #
south side of tracks

150-C

WVRB-150-C

0-.4 lt grey silt lots of organics on end sampled as 0-2

.4-1 - mixed layer some orange coarse sand som blk med coarse dk sand no layers just pockets sampled as 2-D

1-2.1 med brown silt few rocks

2.1-2.8 med brown silt w/some clay no rocks

south side of pit - no identifiable fet

Trench on N side of tracks just by rats
0-.3 lt brown silt w/pebbles <1"
.3-.7 coarse gr blk sand
.7-1' lt gray brown silt to tan silt

1420 WVRB-150-0 0-2" composite A,B,C
* WVRB-150-2 composite A,B,C
WVRB-150-B composite A,B
WVRB-150-NG composite A,B,C

1445 - WVRB-165-A
TD - 1.9' photo # 16

0-.3' - lt gray silt w/ pebbles sampled as 0-.2

.3-.7 med grained blk sand w/ pebbles <1" pockets of orange coarse grained sand sampled .2-.6'

.7-1.2 thin layers of orange brown coarse sand & blk coarse sand sampled .6"-1.0"

1.2-1.9 dk med brown silt w/ large <8" cobbles 50% (rounded) sampled as NG

.3-1.2 layers are very hodge podge no identifiable layers

north side of pit
0-.3 lt gray silt
.3-.4 med grained yellow orange silt w/ pebbles
.4 - NG

Trench just west of pit & north between pit & W.S. Creek
photo # 15
north end
0-.4 - lt gray silt w/ pebbles

.4-.8 - med grained blk sand 2.5

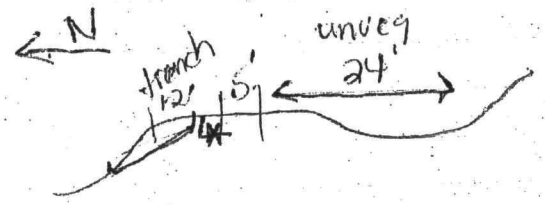
.8-2.5 clayey med grained sand but yellow orange

2.5 - med grained dk brown sand w/ pebbles & roots NG

1515 WVRB-165-A-B > opportunity check w/ FM
composite sample throughout pit of but yellow orange material

South end TD - 2.4
0-.2 lt gray silt
.2-2 but yellow orange
2-2.4 dk brown silty sand
surface expression 60'x 10'
40' to creek -

41' total survey



1530 - off site for day

7/31/03

Sampling

0731 Arrive @ 165-B

J. Flamming
J.M Downey } Pioneer
T. Nuggent - JCI

Sunny, 60s-90s

Safety Mtg: Cross creek w/backhoe
Heat/Drink water for dehydration
Traffic crossing hwy

COVRB-165-B
TD = 2.2'
photo# 122
south side of tracks

0-.1' - rocks <2" rounded
.1-.2' - gray silt w/ pebbles <1" 40%
sampled as 2"

.2-.7' med grained grading to coarse grained black sand pebbles <1"
40-50%

.7 - 1.3 orange coarse grained sand pebbles <1" - 30%

1.3 - 1.5 - coarse grained black sand pebbles <1" - 50-60%

1.5 - 1.9 - med brown silty loam no rocks, some roots

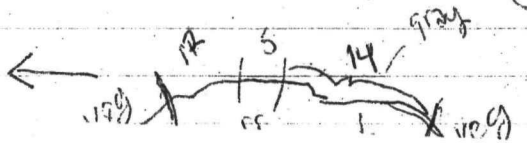
1.9 - 2.2 - lt tan to med brown f.g sand no rocks

south side of pit

0 - .5 - med gray silt w/ pebbles <2" to .3 40-50% .3-.5 larger pebbles < 60%

.5 - 1.1 coarse to med grained black sand

1.1 - 1.4 - med brown silty loam



0820 LOURB 165-C
TD = 2.3 photo# 121
North side of tracks

0 - .2 - <3" gravel mixed rounded
.2 - .3 lt gray silt w/ pebbles <1" 40-50% 0-2" sample

.3 - 1' - med grained blk sand w/ pebble <2" 30% coarser towards bottom sampled as 2-6"

1-1.6 orange red coarse grained sand w/ pebble <3" < 30%

In some places orange sand underlain by lt tan med-coarse sand 1-2" not continuous-

1.6 - 2.3 med brown sandy silt few rocks but rocks are up to 8"

north side of pit
0.7 to 0 - .7 med gray silt
.7 ntl ground

165 C

Trench on north side of underlying wheel track

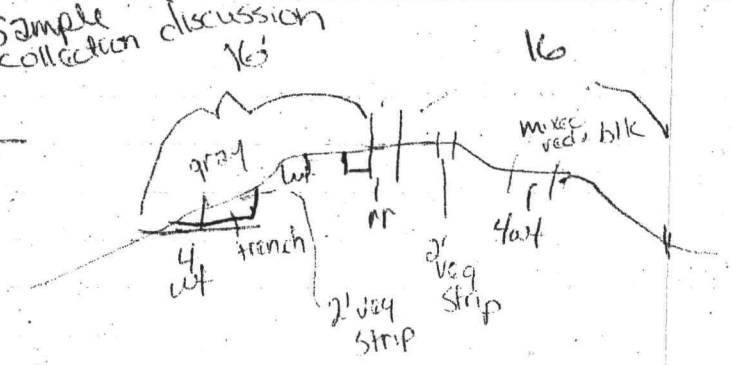
South end of trench on west TD - 2.5
edge of unveg area
0-.7- 11 gray silt w/ pebbles
.7-1.6- coarse grained blk sand w/ pebbles 50-60%
1.6 med brown silt - looks like a thin layer of whole at boundry

North end of trench on west TD - 2.9
1/2 way into 4 wheel track

0.-.2- lt gray silt
.2-1.1 - coarse grained blk material
1.1-2.7- coarse red orange sands lots of concretions (big)
2.7-2.9 med brown silt w/ blue green staining up to 5" at interface

on east side of trench south end waste is only 1' deep - in veg area.

Sample collection discussion



~~0849 Arrive @ 16~~

0835 7/31/09	WVRB-165-0	- 0-2"
	WVRB-165-2	- Blk/Gray material
	WVRB-165-8	- orange material
	WVRB-165-NG	- Natural Ground
7/31/09	WVRB-165-2D	- Dup of WVRB-165-2

Dup was collected by dividing material in comp pan in 1/2-

All samples collected have been collected from freshly scraped test pit walls with a disposable scoop - 1 for each sample interval. Approx 3-4 scoops have been collected at each hole per interval. Material was collected in disposible aluminum pans which were decontd prior to use using a weak (1%) HNO_3

180-A

rinse & then a DI rinse.
Material from approximate interval of 3 test pits was mixed in pan & then put in labeled quart ziplock bag-
If sample was collected from a single location. Sample was collected w/disposable scoop directly into labeled ziplock (quart freezer) bag.
Test pits were dug using a backhoe

CESS WURB-180-A
TD 1.80' photo 1.20
south side of tracks

0-.2 - lt grey silt w/ pebbles 50% <4" sampled as 0-2
.2-1' - coarse grained orange sand w/ some pebbles < 2", 30%
1-1.3 (not consistant throughout pit) coarse blk sand w/ rocks <3" 40% ~~at base of blk/oran~~
1.3-1.5' lt tan silt and interface between waste & NG is a 1/4" blue green line - rocks <4", 30%
1.5-1.8 - med brown silt, rocks 40%

blue green line is consistant throughout pit

NOTE - Red orange and blk material have switched places

South side of pit (at N edge of 4WT)
0-.3 is gray silt
.3-.7 - orange sand blue/green line @ base
.7- med brown silt w/cobbles

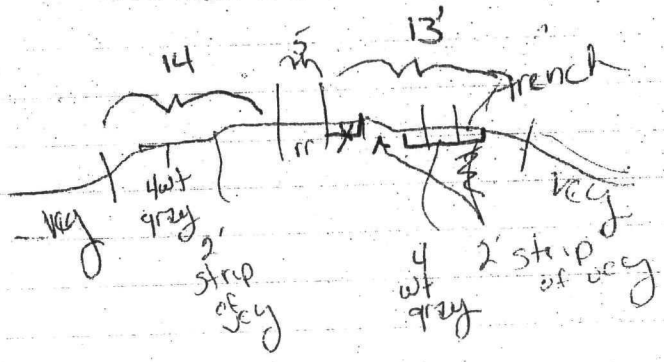
trench through 4WT on south side

North end-
0-.3 gray silt w/red tinge
.3-.9 - orange coarse sand blue/green line @ base
.9- med brown silt

South end
0-.6 lt gray silt w/pebbles
.6-1.5- orange sand mixed w/blk stain blue/green stain @ base

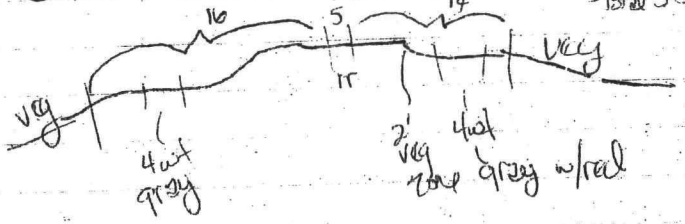
180-A, 180-B

WVRB-180-A



0930 WVRB-180-B

16 5 14 Total 35



TD - 1.7 photo 1A, 11B
north side of tracks

0-.4 lt gray silt w/pebbles <1"
pebbles 50-60%
dead veg on top
sampled as 0-2

.4-1.2 - coarse orange sand some blast pockets at base in a few places med grained sand sampled as 2-

1.2-1.7 med brown silt w few rocks, roots rocks <1/6" 10%

north side of pit

0-.4 - lt gray silt
~1" of orange sand
.4- med brown silt

Trench on north side through 4 wheel track TD
south end TD - 2.4'
0-.5 lt gray silt
.5-2.2 - orange coarse sand
2.2-2.4 - med. brown silt

north end - just off edge of track N side
0-.5 lt gray silt
.5-1' orange sand blue/green line 1/2 at base
1- med brown silt

orange sand not present @ very N end of pit ~ 3/4' past NE profile

1000 E. McCarthy onsite for about 10 minutes

180-C

1040 WVRB-180-C
TD=1.7' photo 116
south side of tracks

0-1.2 med brown silt w/ pebbles <1", 30-40% well developed root
1.2- in some places there is a small ½" to 1" layer of coarse blk sand 10% of the hole
1.2-1.7 med brown silt w/rocks <6" 20-30%

All Natural on south side of hole

No sample from N. side - Dug pit on South side of tracks
TD=2.4 photo # 117
0-.5' med brown silt w/ pebbles <1" sampled 0-2

.5-.9 orange coarse grained sand w/ pebbles < 2" 20-30% sampled 2-13

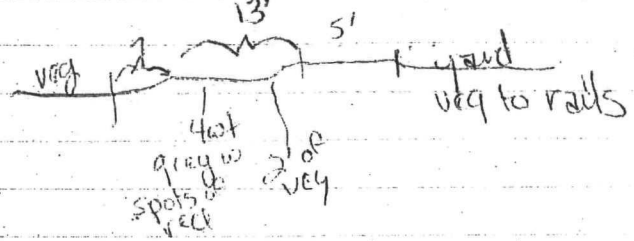
.9-1.15 - blk coarse grained sand up to ½" sampled 2-12

1.15-1.8' dk brown clayey loam no roots no rocks sampled as NG

1.8- red brown slightly clayey silty loam - no rocks

1030 WVRB-180-0
WVRB-180-2
WVRB-180 NG
0-2 comp of ABC mostly orange - natl ground

WVRB-180-C



1045 WVRB-195-A
TD -1.6' photo 116
north side of tracks

0-.2 lt gray silt w/pebbles <1", 40-50% sampled as 0-2"

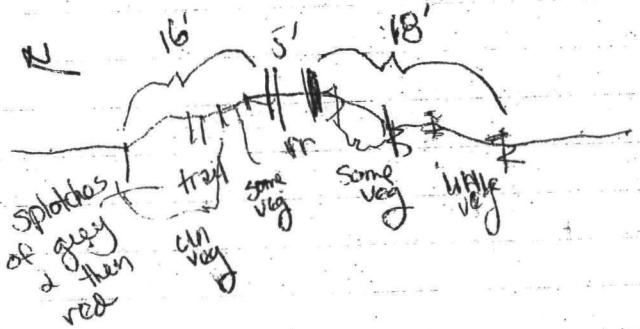
.2-1.2- mixed areas layers of orange coarse material & blk coarse material none run the full length

#6 transition 1B

of wall & they alternate in most places there is a layer of black on the bottom - some blue/green stained rocks

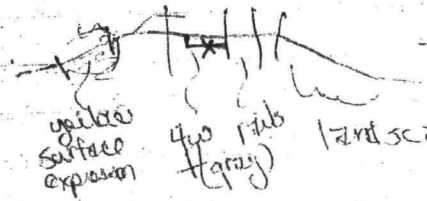
12-13 med brown lt brown clayey silt w/ zeds that are fine grained sand

NW corner of pit
0-.3- lt gray silt
.3-.8- mixed blk & orange layers
.8 med brown clayey silt



1106 Arrive @ WURB-195-B
dug on north side landscaping close to track on south side

WURB-195-B, photo -114



WURB-195 B2 - sampled 40' east of 195-B,
TD: 2.8 Photo # 115
N side of tracks

0-.5 - lt gray silt w/pebbles <1" 40% 0-2"
.5-1' - coarse orange red sand
1-18' - coarse grained blk sand some cinder material in it. } 2-12"

18-20 lt brown clayey silt w/ rocks <2" NG

2.0-2.8 med brown clayey silt w/rocks <6" 30-40%

8 5

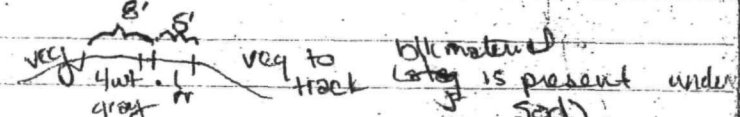
N Side of pit 0-.8 lt grey s/l
.8-1' ~~from blk sand~~ orange sand
1'-1.3'- orange sand
1.3- brown clay

195-B is original sample site -
It appears to be in a drainage area a waste was considerably deeper than we had seen.
On north side of pit small area 8x10 w/ surface expression of yellow silt
culvert relatively close by photo 113

195-B, 0-.5 lt grey silt
South side .5-1' mod grained blk sand
.5-4.3'- dk red brown coarse concrete sand
4.3- Natl ground brown silt

lots of timbers removed from hole (5%)

WVRB-195-B2

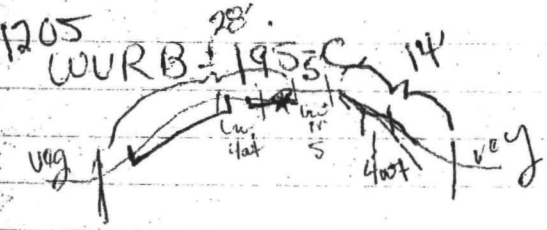


North side of B, 0-.5 grey silt
.5-.8 blk sand
.8-2.8 orange sand
2.8- Natl grd

50' west of WVRB-195-B, another area of yellowish material w/ blue green stained roots 20x 20'

trail on this side of GPS steel (north side) 50% red & 50% gray
4wt resumes on south side

1205



28 14 5 47 unveg

TD=2.6' photo # 111
south side of tracks

0-.2'- grey silt w/ pebbles <1" 40-50%
.2-1.2 coarse grained black material @ base w/ med grained

blk material @ top - mixed in w/ pockets of orange red coarse sand, rocks <3" 40-50%
1.2-2.1' - mixed zone, comprised of orange sand, blk material, & native soils, med grained orange sand rocks <6" - 30-40%
2.1-2.6 med brown silt few rocks

South side of pit
0-.2 lt gray silt
.2-1' mixed zone mostly NG
1- med brown silt

Trench on north side from base to middle of pit -
Photos 110 & 109
N end -
0-.3 lt grey silt
.3-.7 - mixed orange sand / blk sand
.7- NG

S end by 4wd track
0-.3-lt grey silt
.3-.7- dk material lots of pebbles

.7-3' orange sand
3' NG ?

1230 WVRB-195-0 0-2" comp of A, Bc
~~1300 Arrive @~~ WVRB-195-2 blk/orange
WVRB-195-NG native grvl

1300 WVRB-210-A
TD- 2.3' photo# 108
north side of tracks

0-.2- lt grey silt w/pebbles <1"
40-50%

.2-.6 med grained-brown sand w/pebbles <1"

.6-1 - coarse grained orange brown sand rocks <2"

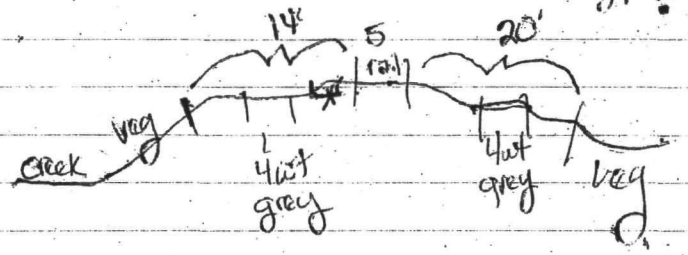
1-1.2- coarse grained black sand/cinder pebbles <1"

1.2-1.4 pink clayey silt w/pebbles <1"

1.4-2.3 dk brown silty loam w/ a touch of clay - few rocks

north side of pit
0-.2 - fine grained gray silt
.2-.4 orange coarse grained sand
.4-1.2 - blk coarse grained sand w/ silt & pebbles <1"
1.2 - Brown med silt -

39' unveg



1345-UVRB-210-B
TD-

0-.6 med gray silt w/ pebbles <1" 40-50%

.6-1' - coarse blk ~~sand~~ few rocks

1.-1.3 dk brown silt w/ roots few rocks - forms ~~layers~~

1.3-1.7' - med brown to lt brown silt few rocks some clay

~~south~~
north side
0-.6 - gray silt
.6-.65 - blk sand
.7 - med brown silt

Trench on N side TD-1.2'

south end
0-.4 - med brown silt w/ ~~pebbles~~
.4-.7 - tan coarse sand slight yellow tinge
.7-1.2 coarse black sand pebbles <1" 40-50%
1.2 - NG - brown silt

North end
0-.5 - coarse blk sand
.5-1.0 - coarse orange sand
1.0 - med brown silt

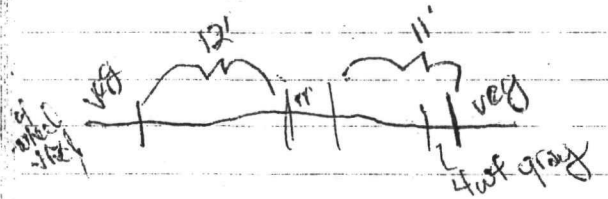
1435 LWVRB-210-0 0-2 comp of A&B
LWVRB-210-2 2-6 " "
LWVRB-210-8 6-18 " "
LWVRB-210-NG NG " "
LWVRB-210-NG(D) NG " "

N of trails approx 35'
is ~~set~~ 4 w trail

In pit present by trail (to build jump

0-.5 gray silt
.5-20 black cinder/sand
~~2.0~~ some orange sand
stained blue/green rocks

LWVRB-210-B



1445 Back hm off site

1~~3~~0 Collect LWVRB 90A 0
0-2" from 4 wheel tracks.
1/2 of sample from each side of railroad bed opportunistic sample

1515 - GPS pnts not ~~collected~~ GPS'd on 7/29/03

1700 off site for day

7/30/03 LWVRB-B 3 1200

Blank sample prepared for silica sand

7/31/03 LWVRB-B-4 1330

Blank sample prepared for silica sand

APPENDIX D

LABORATORY RESULTS AND QUALIFIERS

TO: PIONEER TECHNICAL SERVICES AUG. 11, 2003
SHAWN BISCH

FROM: ASHE ANALYTICS
JOHN ASHE

SUBJECT: ANALYTICAL REPORT NO. SB0811D
PROJECT: WVRB

EIGHTY (80) SAMPLES WERE RECEIVED ON 08/04/03
FOR TOTAL METALS ANALYSIS (As) BY XRF.
RESULTS ARE PRESENTED BELOW.

LAB NUMBEF	SAMPLE I.D.	As mg/kg	As FLAG	SAMPLE PREP GROUP
D-0764	WVRB-WE-0	105		999606
D-0765	WVRB-WE-2	96.5		999606
D-0766	WVRB-WE-8	61		999606
D-0767	WVRB-WE-NG	76.5		999606
D-0768	WVRB-WE-C-0	583		999606
D-0769	WVRB-WE-C-2	418		999606
D-0771	WVRB-WE-C-N(	367		999606
D-0772	WVRB-WE-D-0	126		999606
D-0773	WVRB-WE-D-2	49.2		999606
D-0774	WVRB-WE-D-8	58.8		999606
D-0775	WVRB-WE-D-N(	55.8		999606
D-0776	WVRB-WE-0-12	401		999606
D-0777	WVRB-0-0	2050		999606
D-0778	WVRB-0-2	3320		999606
D-0779	WVRB-0-8	194		999606
D-0780	WVRB-0-NG	201		999606
D-0781	WVRB-15-0	1690		999606
D-0782	WVRB-15-2	2140		999606
D-0783	WVRB-15-NG	82.4		999606
D-0784	WVRB-30-0	1830		999606
D-0785	WVRB-30-2	1470		999606
D-0786	WVRB-40-8	959		999606
D-0787	WVRB-30-NG	48.9		999606
D-0788	WVRB-B-1	8.6	U	999606
D-0789	WVRB-45-0	692		999606
D-0790	WVRB-45-2	1260		999606
D-0791	WVRB-45-8	997		999606
D-0792	WVRB-45-8D	1110		999606
D-0793	WVRB-45-NG	241		999606
D-0794	WVRB-60-0	1600		999606
D-0795	WVRB-60-2	2390		999606
D-0796	WVRB-60-8	856		999606
D-0797	WVRB-60-NG	76.8		999606
D-0798	WVRB-75-0	3260		999606

D-0799	WVRB-75-2	3940		999606
D-0800	WVRB-75-8	1760		999606
D-0801	WVRB-75-NG	116		999607
D-0802	WVRB-90-0	1620		999607
D-0803	WVRB-90-2	876		999607
D-0804	WVRB-90-NG	114		999607
D-0805	WVRB-95-0	1160		999607
D-0806	WVRB-95-0D	1100		999607
D-0807	WVRB-95-2	1870		999607
D-0808	WVRB-95-NG	77		999607
D-0809	WVRB-105-0	2630		999607
D-0810	WVRB-105-2	1520		999607
D-0811	WVRB-105-NG	142		999607
D-0812	WVRB-120-0	2770		999607
D-0813	WVRB-120-2	1980		999607
D-0814	WVRB-120-NG	96		999607
D-0815	WVRB-135A-0	4650		999607
D-0816	WVRB-135A-2	1770		999607
D-0817	WVRB-135-0	3570		999607
D-0818	WVRB-135-2	1390		999607
D-0819	WVRB-135-NG	196		999607
D-0820	WVRB-150-0	2500		999607
D-0821	WVRB-150-2	2030		999607
D-0822	WVRB-150-8	462		999607
D-0823	WVRB-150-NG	96.5		999607
D-0824	WVRB-165-A-8	466		999607
D-0825	WVRB-165-0	2070		999607
D-0826	WVRB-165-2	2700		999607
D-0827	WVRB-165-8	1060		999607
D-0828	WVRB-165-NG	27.2		999607
D-0829	WVRB-165-2D	2560		999607
D-0830	WVRB-180-0	2000		999607
D-0831	WVRB-180-2	1620		999607
D-0832	WVRB-180-NG	27.9		999607
D-0833	WVRB-195-0	1410		999607
D-0834	WVRB-195-2	1230		999607
D-0835	WVRB-195-NG	38.5		999607
D-0836	WVRB-210-0	1130		999607
D-0837	WVRB-210-2	1600		999607
D-0838	WVRB-210-8	1410		999607
D-0839	WVRB-210-NG	87.9		999607
D-0840	WVRB-210-NGD	81		999607
D-0841	WVRB-90A-0	3490		999608
D-0842	WVRB-B-3	8.6	U	999608
D-0843	WVRB-B-4	8.6	U	999608
D-0844	WVRB-B-2	8.6	U	999608

TO: PIONEER TECH. SVCS. AUG. 11, 2003
SHAWN BISCH

FROM: ASHE ANALYTICS
JOHN ASHE

SUBJECT: ANALYTICAL REPORT NO. SB0811QC
LABORATORY QA/QC FOR REPORT DB0811D

LAB NUMBER	SAMPLE I.D.	AS PPM
999606	XCS	3.036
990606	BLANK	

ABOVE BLANKS ASSOCIATED WITH SAMPLE PREP GROUP 999606.
MISSING ENTRIES IMPLY ZERO CONCENTRATION OUTPUT.
ALL READINGS BELOW MDL.

N-2710	ICV, 08/07/03	606.787
CERTIFIED		626
RECOVERY		96.9308

D-0780.1		201.007
D-0780.2	LAB DUP	196.495
D-0780R	LAB REP	200.297
LAB DUP RPD		2.27018
LAB DUP RPD		0.35385

N-2710	LCS	621.208
CERTIFIED		626
RECOVERY		99.2345

ABOVE LCS ASSOCIATED WITH SAMPLES D-0764 THRU D-0780.

D-0800.1		1755.14
D-0800.2	LAB DUP	1722.73
D-0800R	LAB REP	1645.49
LAB DUP RPD		1.86384
LAB DUP RPD		6.44899

999607	XCS	1.123
990607	BLANK	2.463

ABOVE BLANKS ASSOCIATED WITH SAMPLE PREP GROUP 999607.
MISSING ENTRIES IMPLY ZERO CONCENTRATION OUTPUT.
ALL READINGS BELOW MDL.

N-2710	LCS	594.816
CERTIFIED		626
RECOVERY		95.0185

ABOVE LCS ASSOCIATED WITH SAMPLES D-0781 THRU D-0800.

D-0820.1		2501.05
D-0820.2	LAB DUP	2531.58
D-0820R	LAB REP	2430.32
LAB DUP RPD		1.2132
LAB DUP RPD		2.86857

N-2710	LCS	644.535
CERTIFIED		626
RECOVERY		102.961

ABOVE LCS ASSOCIATED WITH SAMPLES D-0801 THRU D-0820.

N-2710	ICV, 08/08/03	631.012
CERTIFIED		626
RECOVERY		100.801

D-0840.1		81.031
D-0840.2	LAB DUP	81.098
D-0840R	LAB REP	98.43
LAB DUP RPD		0.08265
LAB DUP RPD		19.3903

999608	XCS	3.004
990608	BLANK	2.687

ABOVE BLANKS ASSOCIATED WITH SAMPLE PREP GROUP 999608.
MISSING ENTRIES IMPLY ZERO CONCENTRATION OUTPUT.
ALL READINGS BELOW MDL.

N-2710	LCS	635.569
CERTIFIED		626
RECOVERY		101.529

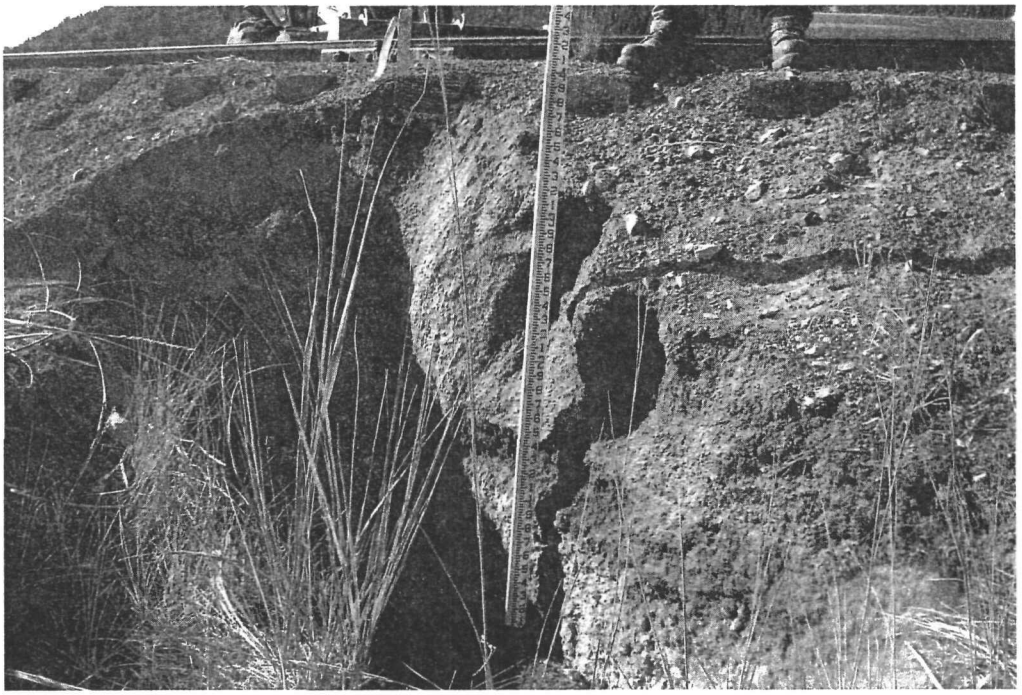
ABOVE LCS ASSOCIATED WITH SAMPLES D-0821 THRU D-0840.

N-2710	LCS	651.28
CERTIFIED		626
RECOVERY		104.038

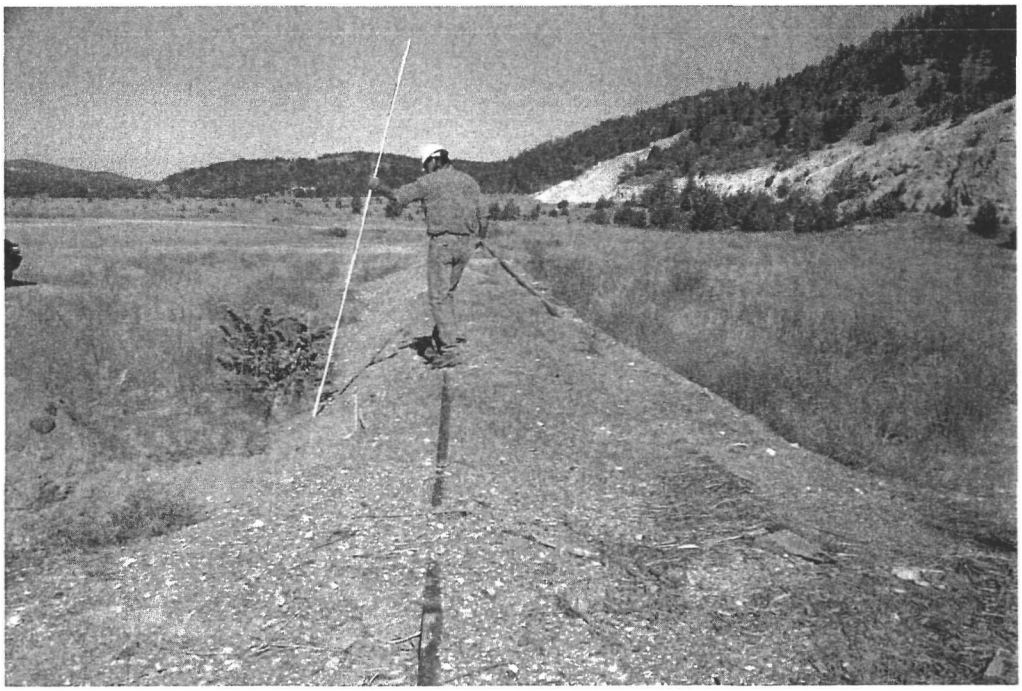
ABOVE LCS ASSOCIATED WITH SAMPLES D-0841 THRU D-0844.

APPENDIX E

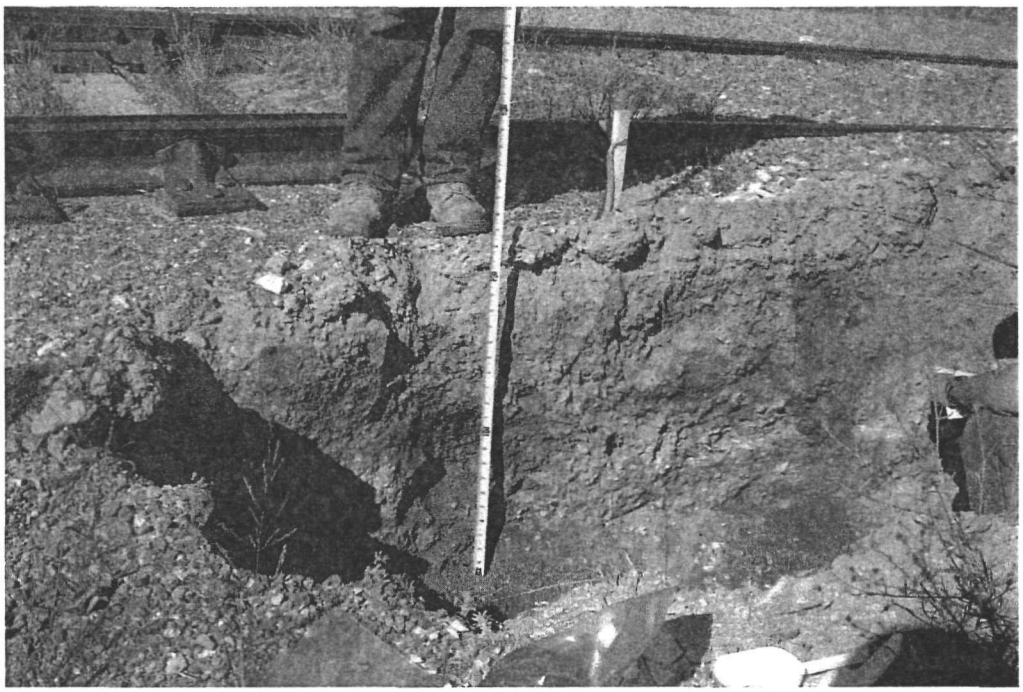
INVESTIGATION PHOTOS



Picture #: West Valley RR Photos/Image051.jpg	Description: Test Pit WVRB-WE-B

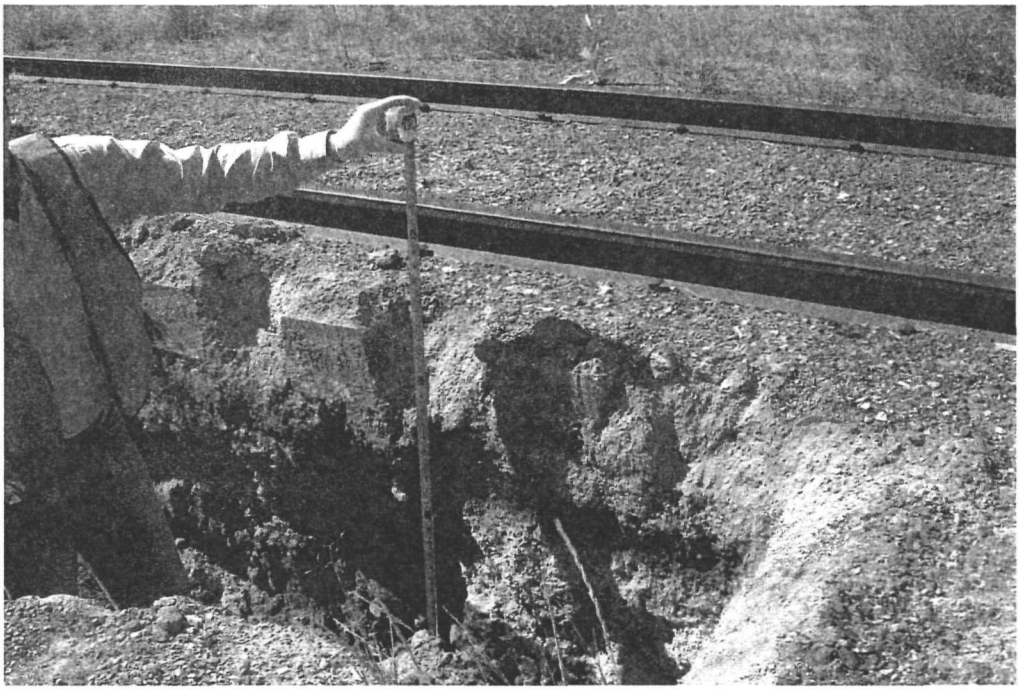


Picture #: West Valley RR Photos/Image052.jpg	Description: WVRB-West End Addition
PREPARED FOR: Atlantic Richfield Company, A BP affiliated company	Project: 2003 RDU5 West Valley Railroad Bed Investigation



Picture #: West Valley RR Photos/Image053.jpg	Description: Test Pit WVRB-WE-C

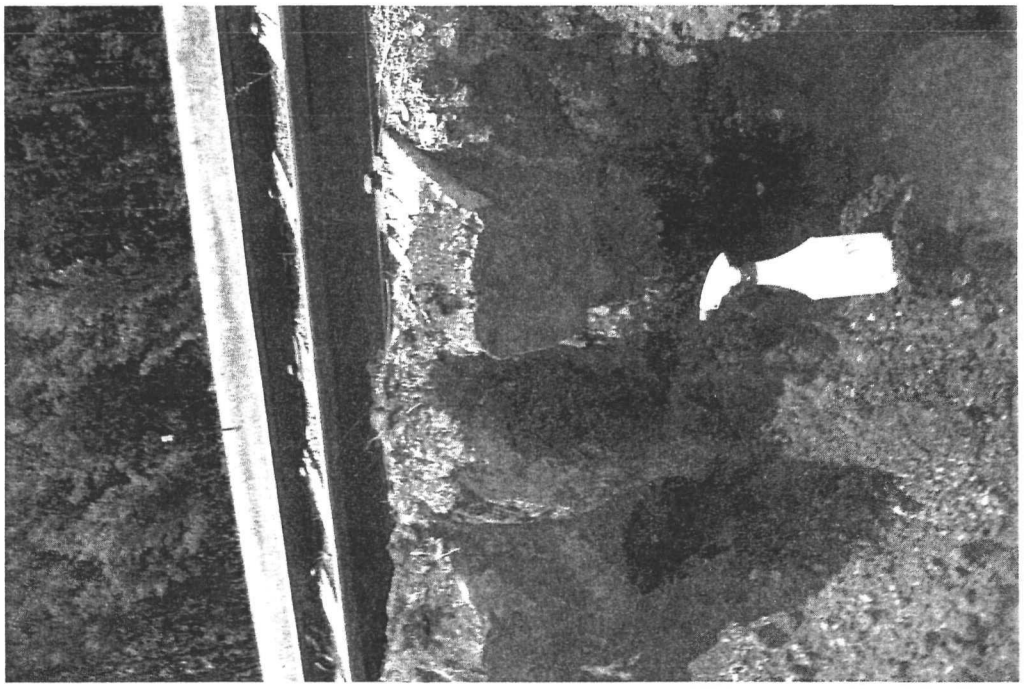
Picture #: West Valley RR Photos/Image054.jpg	Description: Test Pit WVRB-WE-D



Picture #: West Valley RR Photos/Image055.jpg	Description: Test Pit WVRB-WE-D

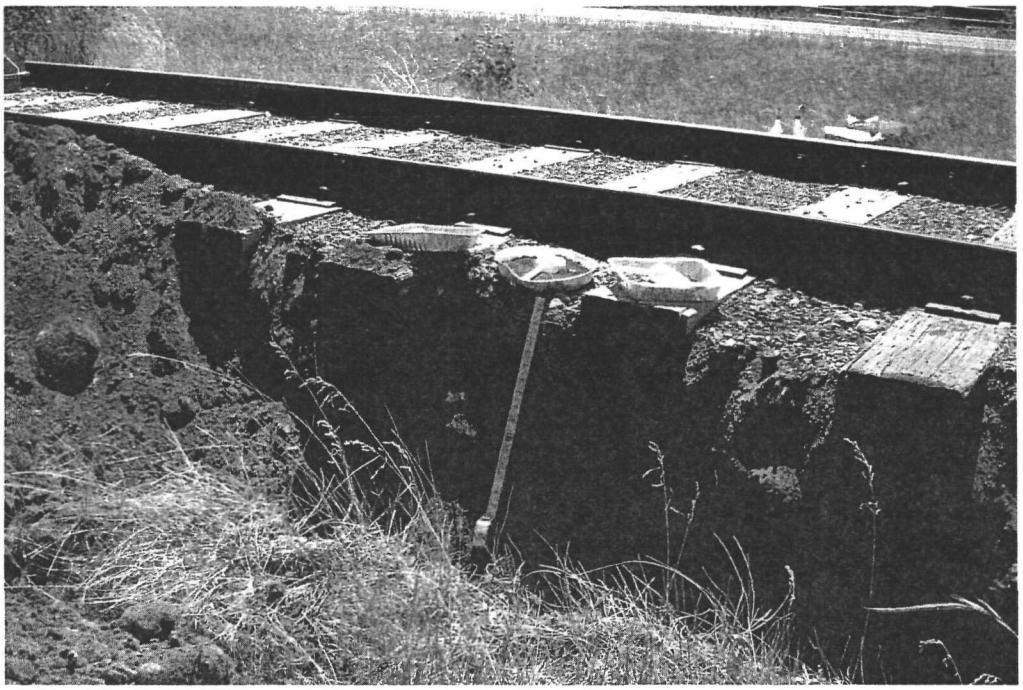
Picture #: West Valley RR Photos/Image056.jpg	Description: Test Pit by a switch – Not Sampled

Picture #: West Valley RR Photos/Image057.jpg	Description: Test Pit WVRB-0-A



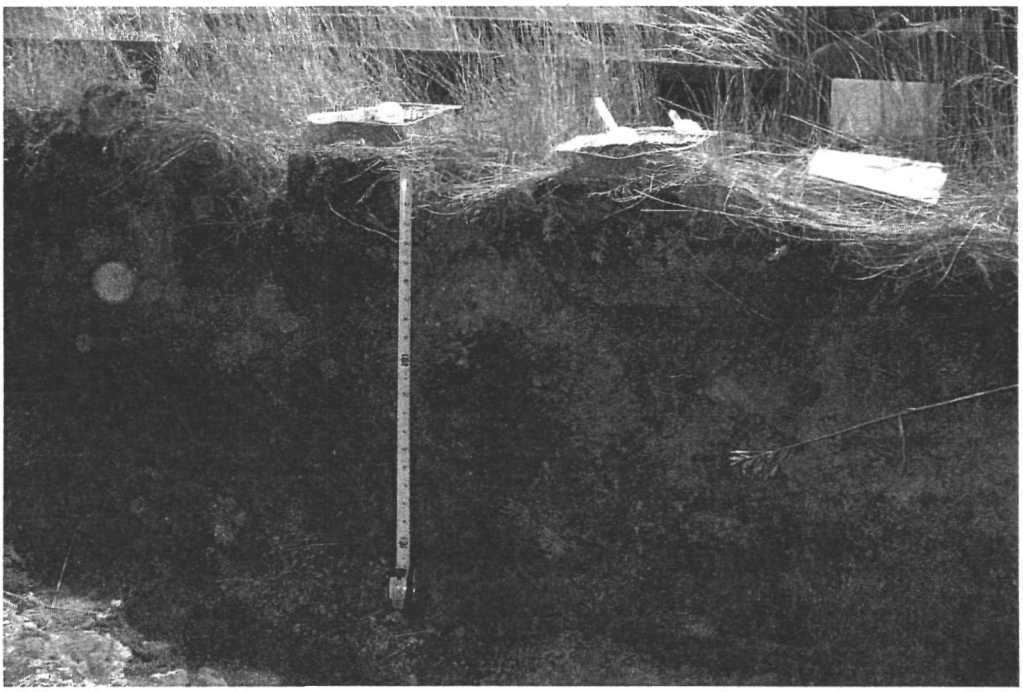
Picture #: West Valley RR Photos/Image058.jpg	Description: Test Pit WVRB-0-B

Picture #: West Valley RR Photos/Image059.jpg	Description: Test Pit WVRB-0-C

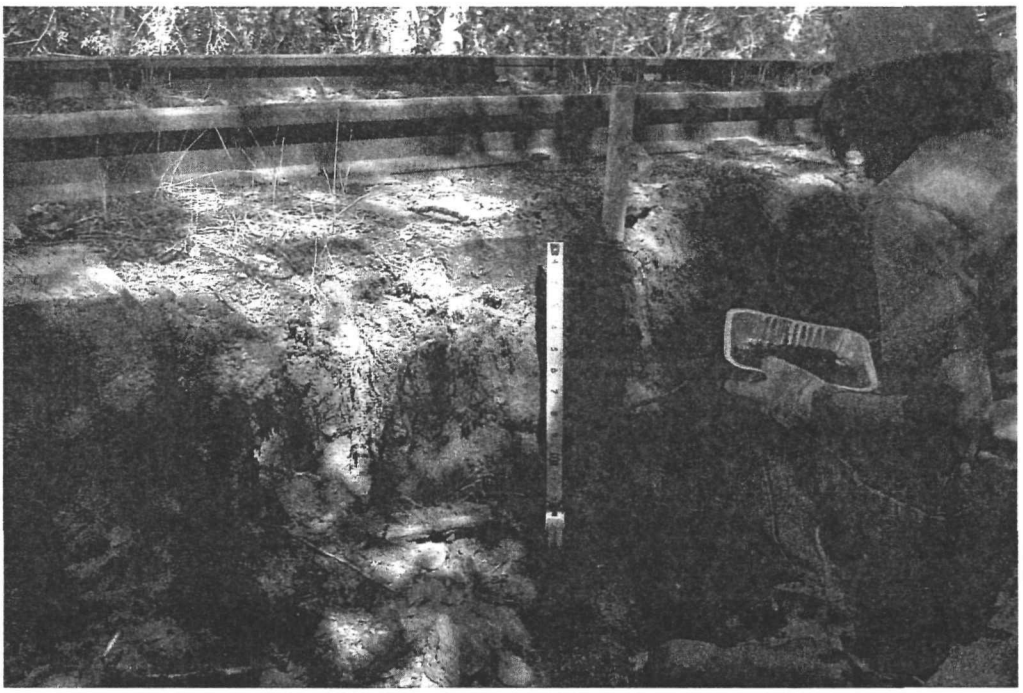


Picture #: West Valley RR Photos/Image060.jpg	Description: Test Pit WVRB-15-A
PREPARED FOR: Atlantic Richfield Company bp A BP affiliated company	Project: 2003 RDU5 West Valley Railroad Bed Investigation

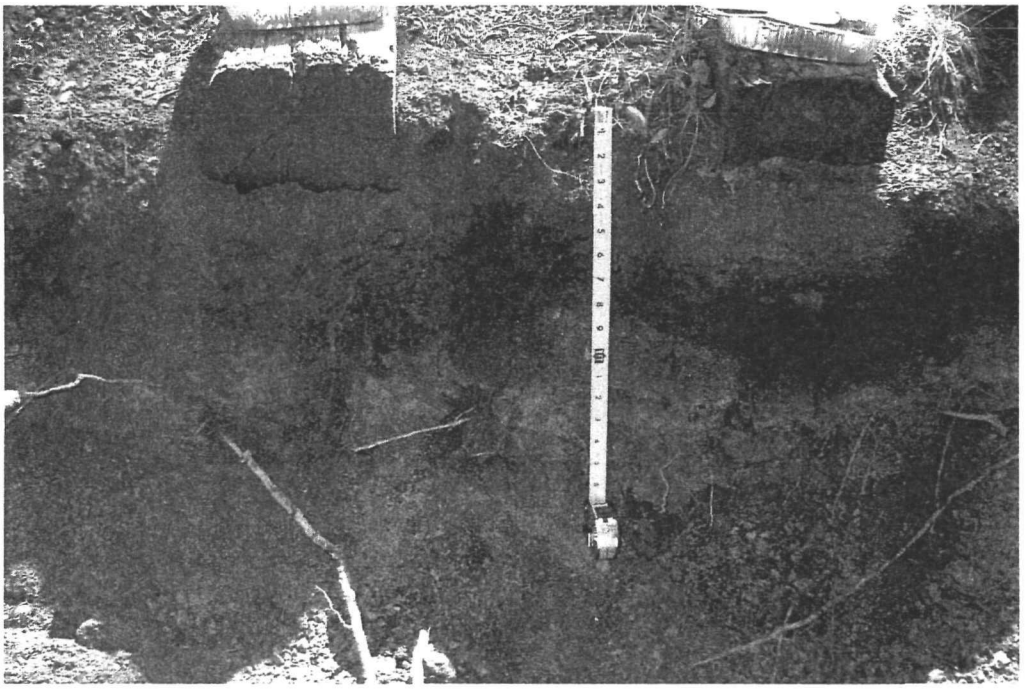
Picture #: West Valley RR Photos/Image061.jpg	Description: Test Pit WVRB-15-B



Picture #: West Valley RR Photos/Image062.jpg	Description: Test Pit WVRB-15-C

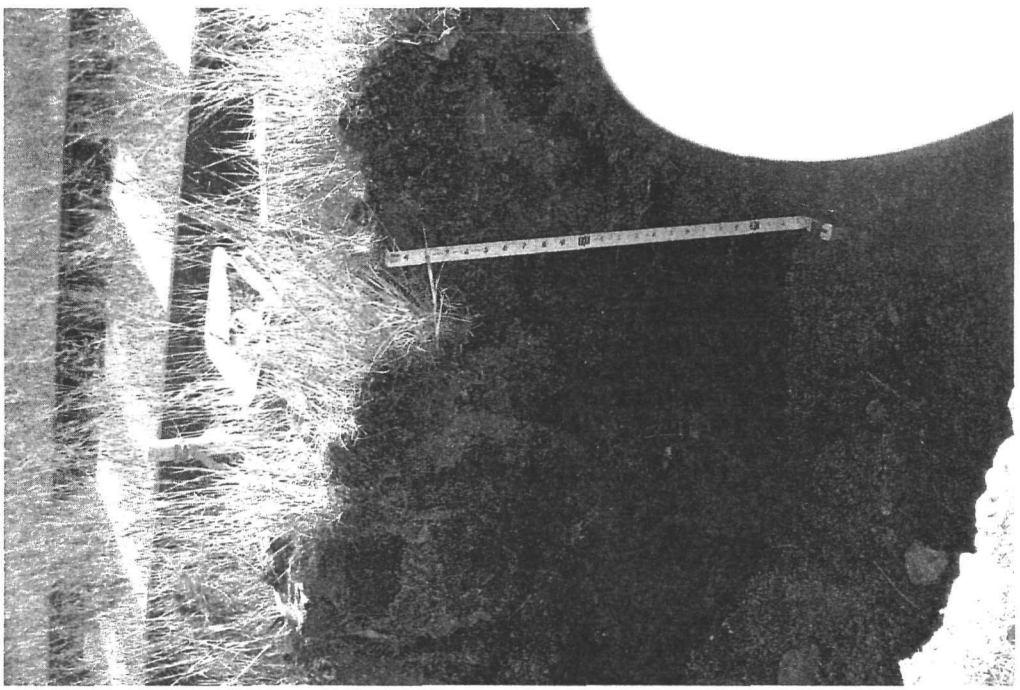


Picture #: West Valley RR Photos/Image063.jpg	Description: Test Pit WVRB-30-A

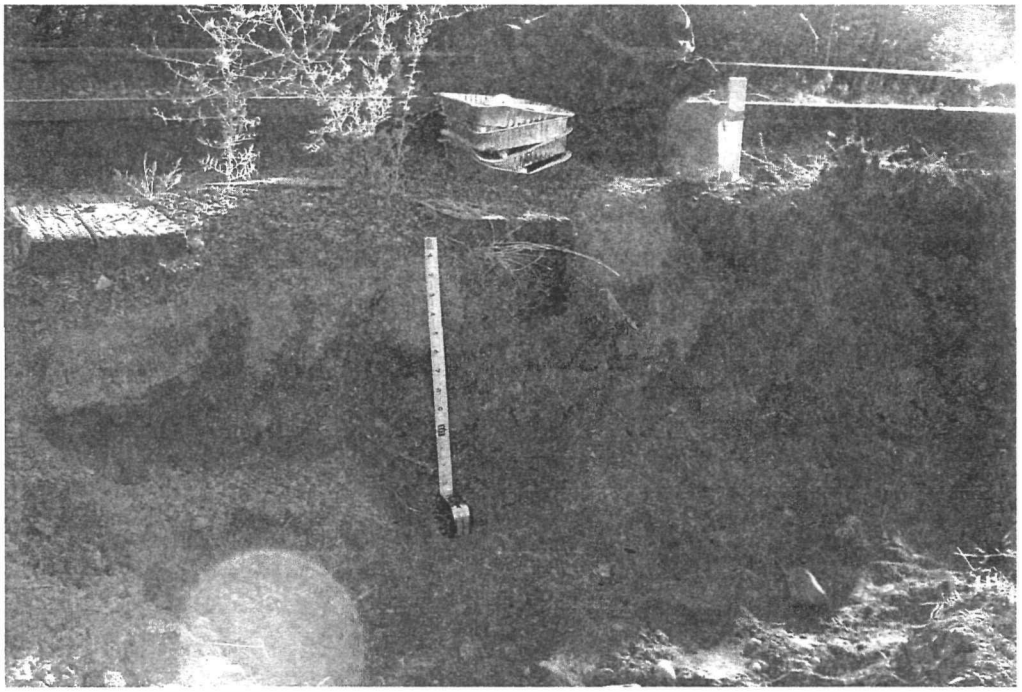


Picture #: West Valley RR Photos/Image064.jpg	Description: Test Pit WVRB-30-B

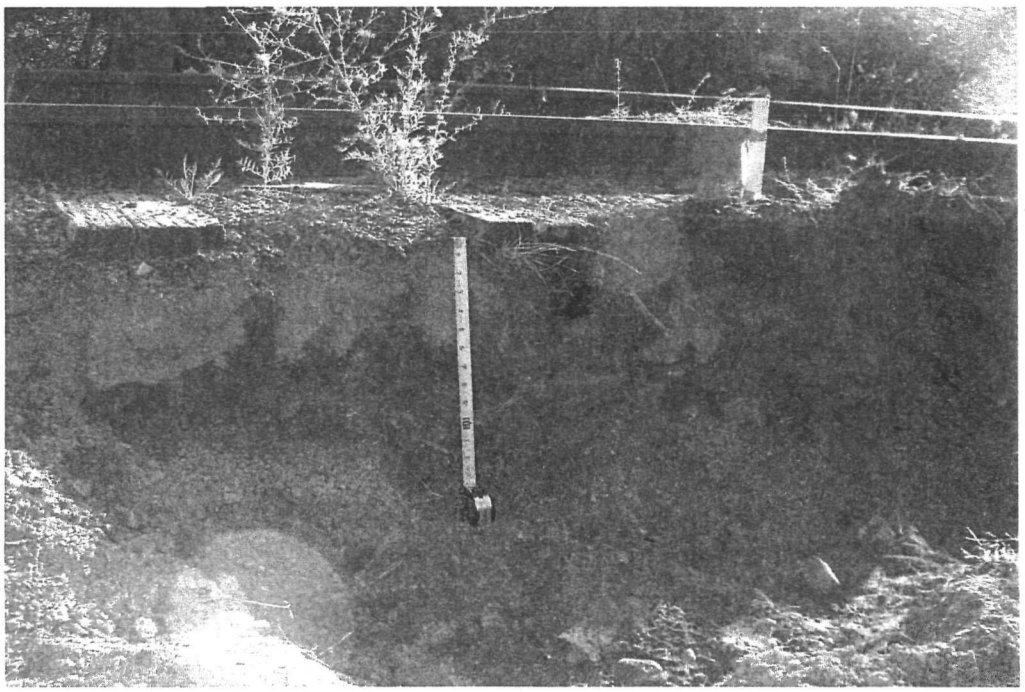
Picture #: West Valley RR Photos/Image065.jpg	Description: Test Pit WVRB-30-C



Picture #: West Valley RR Photos/Image066.jpg	Description: Test Pit WVRB-45-A
PREPARED FOR: Atlantic Richfield Company, A BP affiliated company	Project: 2003 RDU5 West Valley Railroad Bed Investigation



Picture #: West Valley RR Photos/Image067.jpg	Description: Test Pit WVRB-45-B



Picture #: West Valley RR Photos/Image068.jpg	Description: Test Pit WVRB-45-B

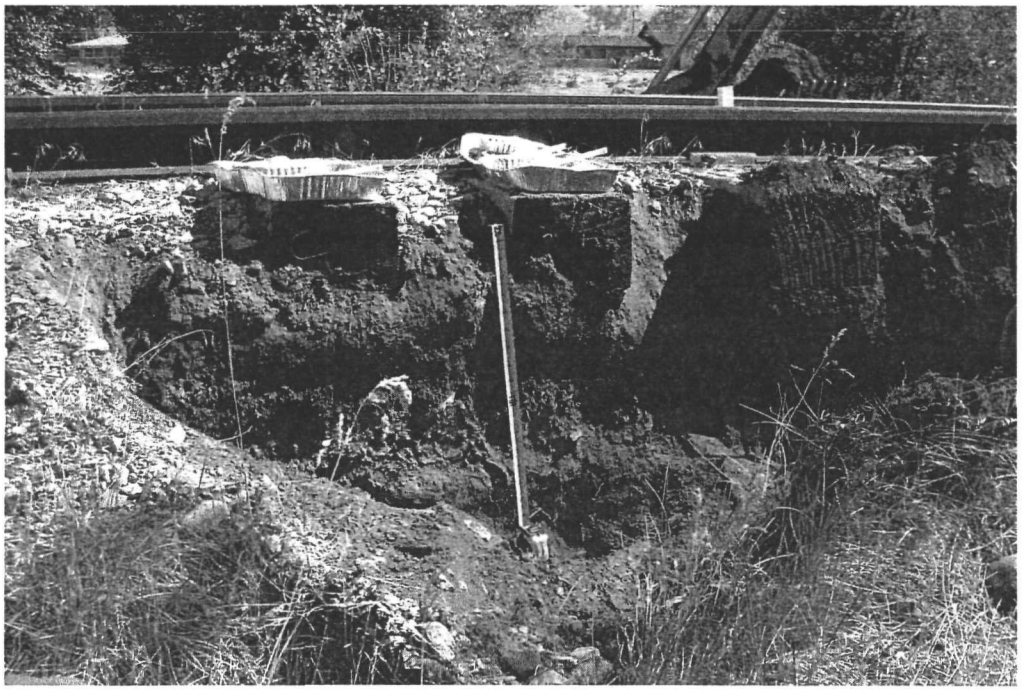
Picture #: West Valley RR Photos/Image069.jpg	Description: Test Pit WVRB-45-C

Picture #: West Valley RR Photos/Image070.jpg	Description: Test Pit WVRB-60-A

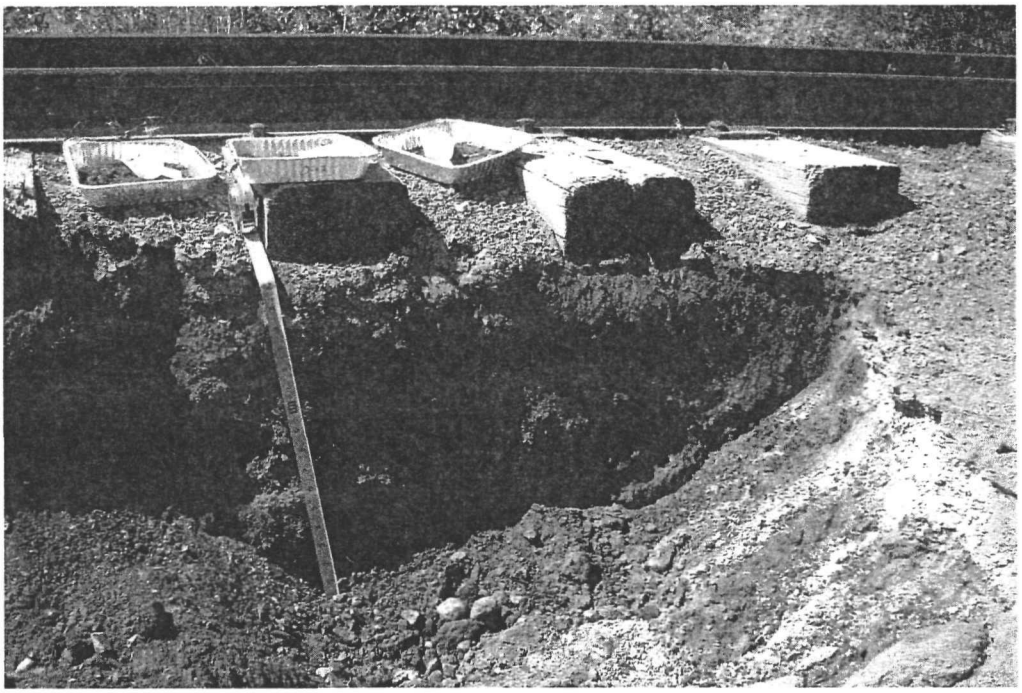
Picture #: West Valley RR Photos/Image071.jpg	Description: Trench on south side of tracks from Test Pit WVRB-60-A

Picture #: West Valley RR Photos/Image072.jpg	Description: Trench on north side of tracks by Test Pit WVRB-60-A

Picture #: West Valley RR Photos/Image073.jpg	Description: Test Pit WVRB-60-B

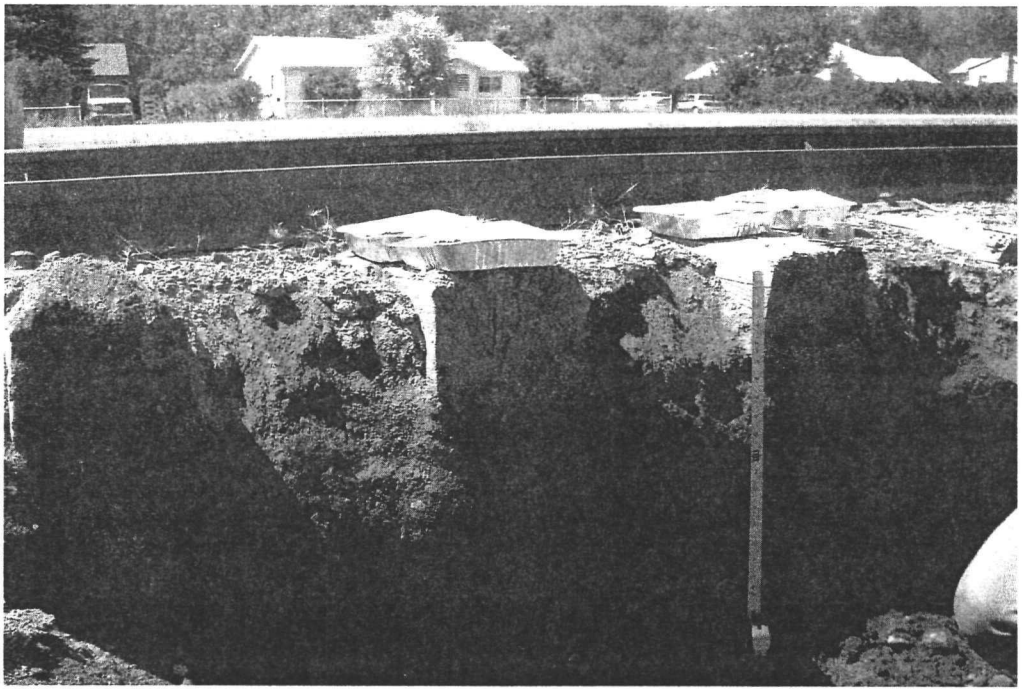


Picture #: West Valley RR Photos/Image074.jpg	Description: Test Pit WVRB-60-C



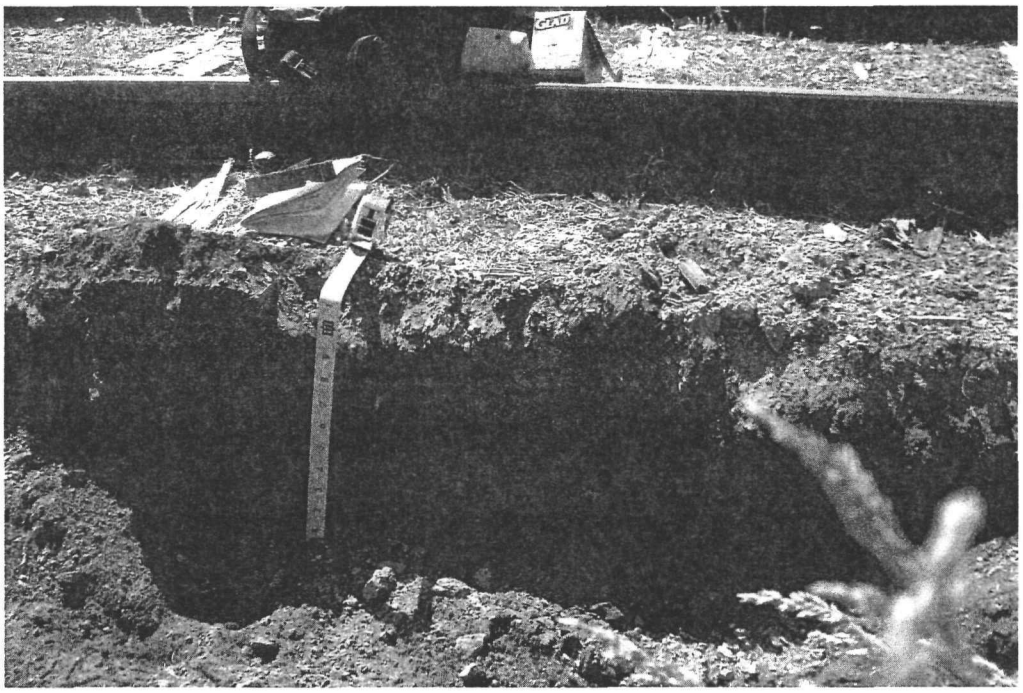
Picture #: West Valley RR Photos/Image075.jpg	Description: Test Pit WVRB-75-A

Picture #: West Valley RR Photos/Image076.jpg	Description: Test Pit WVRB-75-A



Picture #: West Valley RR Photos/Image077.jpg	Description: Test Pit WVRB-75-B

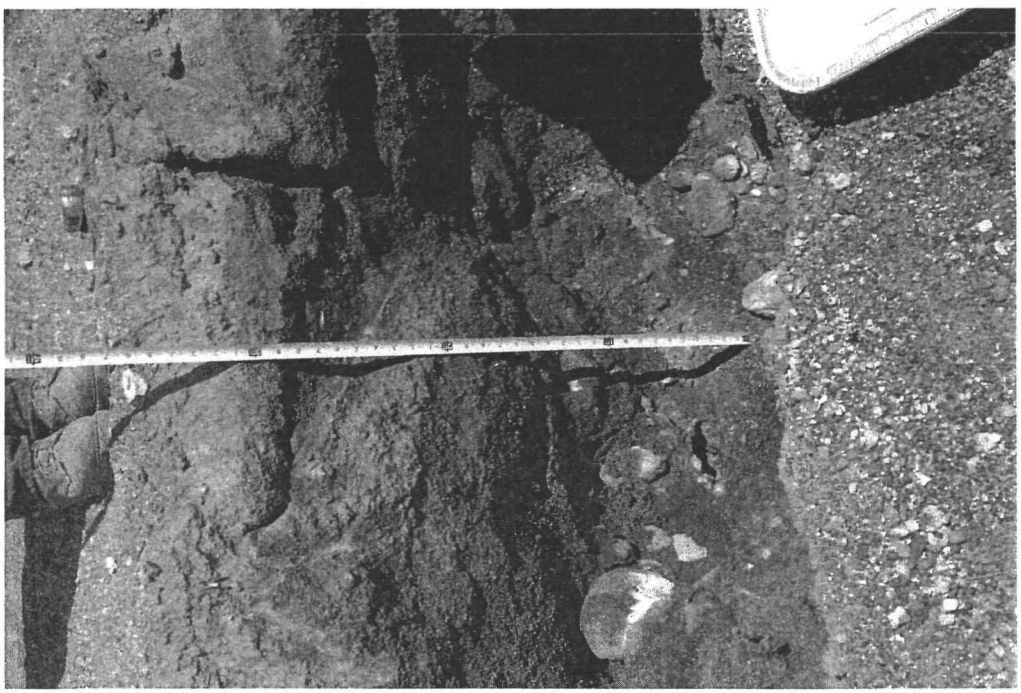
Picture #: West Valley RR Photos/Image078.jpg	Description: Test Pit WVRB-75-C



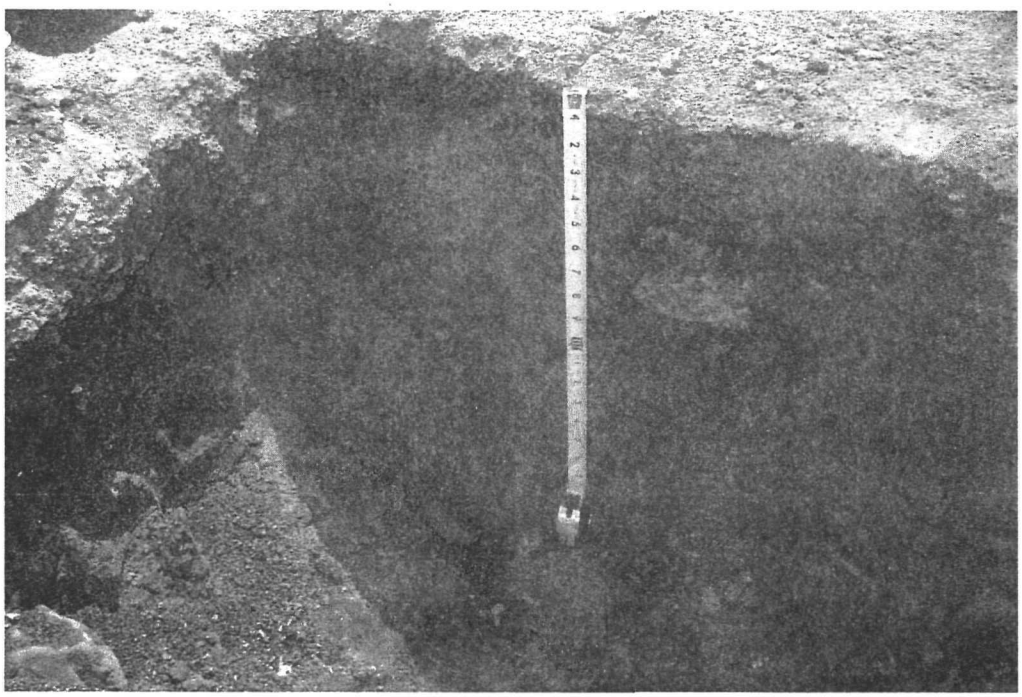
Picture #: West Valley RR Photos/Image079.jpg	Description: Test Pit WVRB-90-A

Picture #: West Valley RR Photos/Image080.jpg	Description: Test Pit WVRB-90-B

Picture #: West Valley RR Photos/Image081.jpg	Description: Test Pit WVRB-95-B

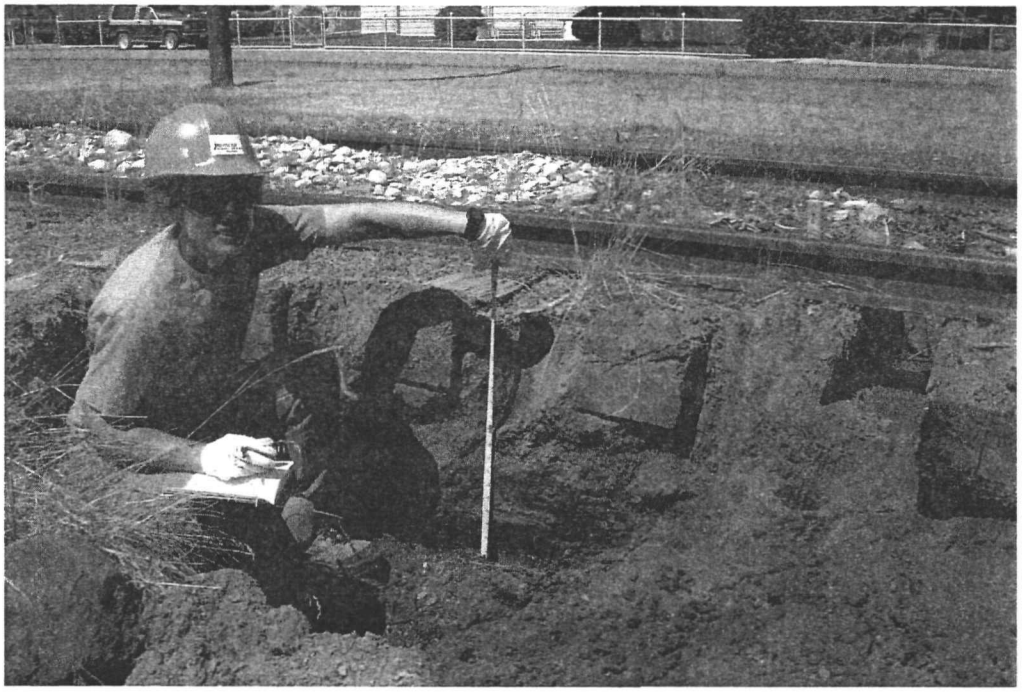


Picture #: West Valley RR Photos/Image082.jpg	Description: Test Pit WVRB-95-B
PREPARED FOR: Atlantic Richfield Company, A BP affiliated company	Project: 2003 RDU5 West Valley Railroad Bed Investigation

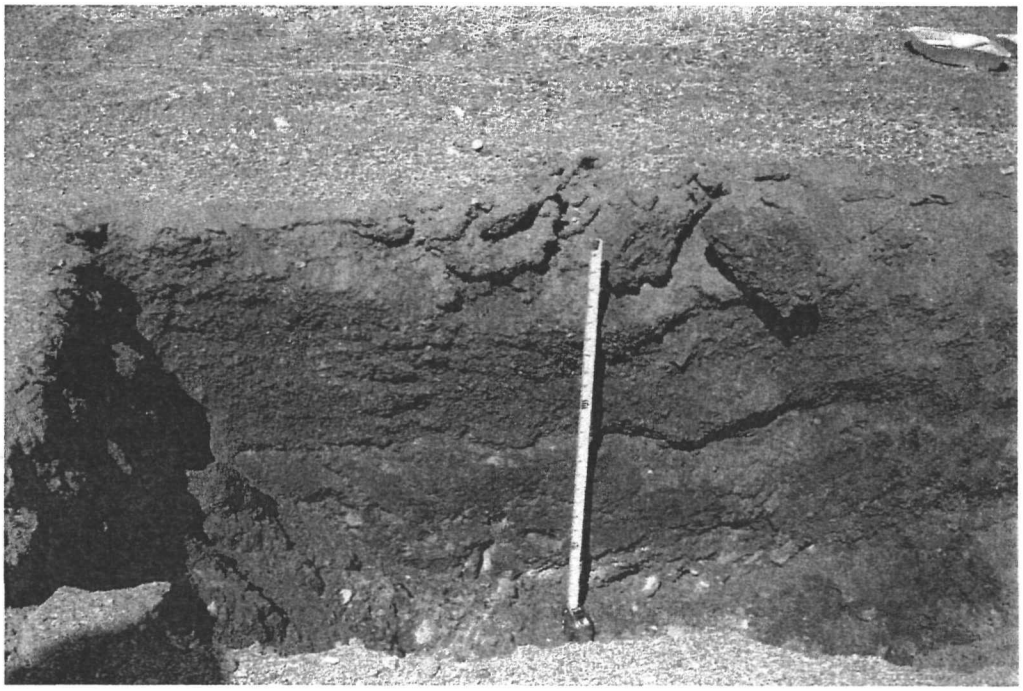


Picture #: West Valley RR Photos/Image083.jpg	Description: Test Pit WVRB-95-A

Picture #: West Valley RR Photos/Image084.jpg	Description: Trench on north side of Test Pit WVRB-90-C

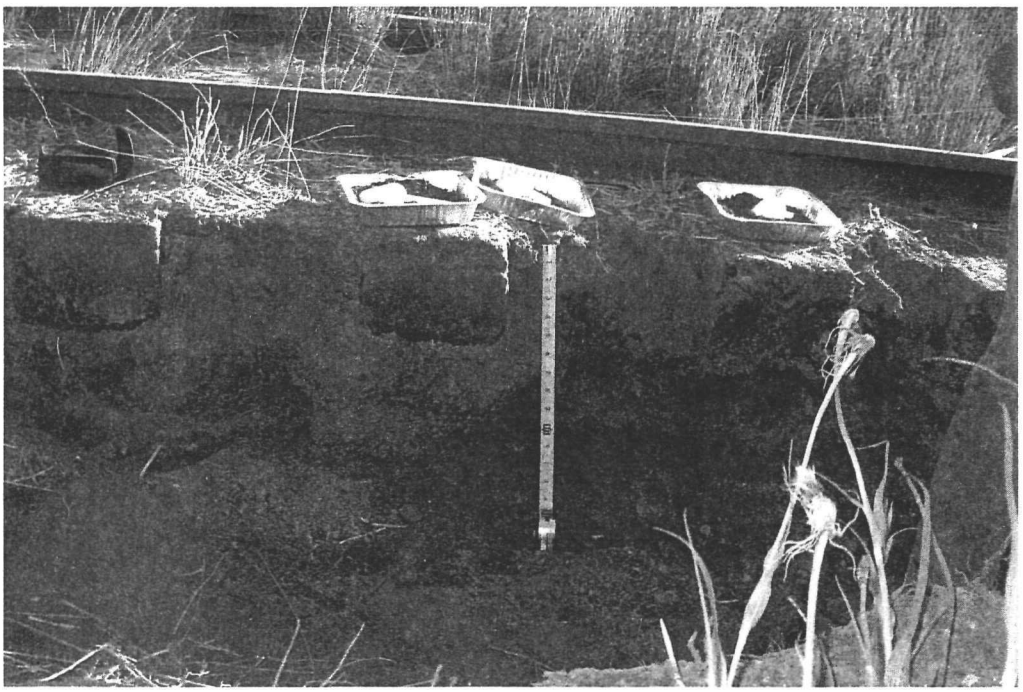


Picture #: West Valley RR Photos/Image085.jpg	Description: Test Pit WVRB-90-C



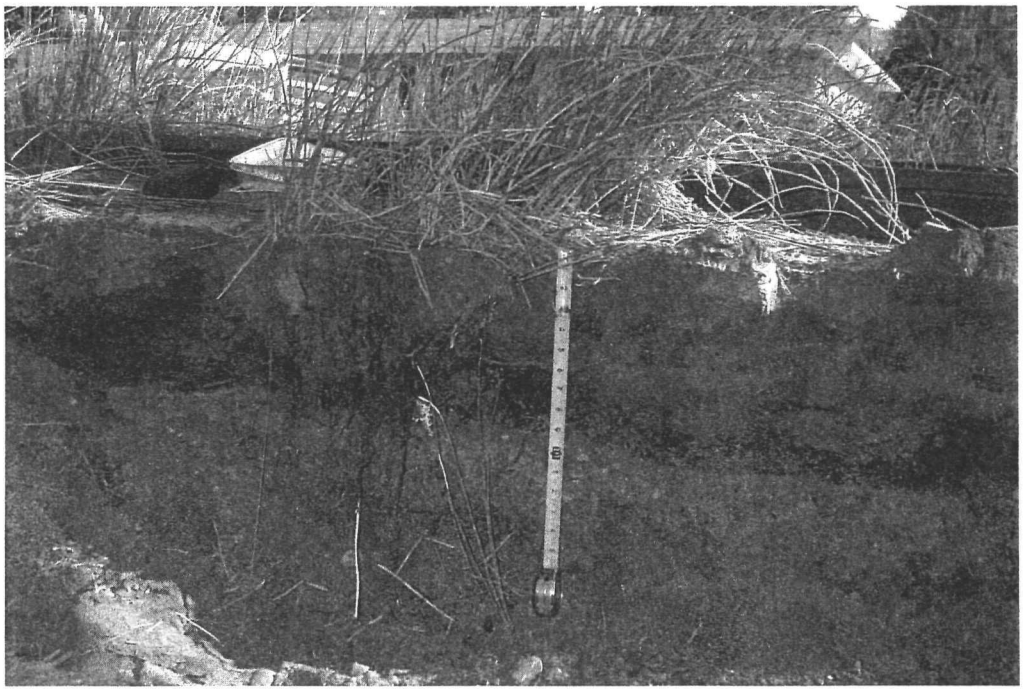
Picture #: West Valley RR Photos/Image086.jpg	Description: Test Pit WVRB-95-C

Picture #: West Valley RR Photos/Image087.jpg	Description: Test Pit WVRB-105-A



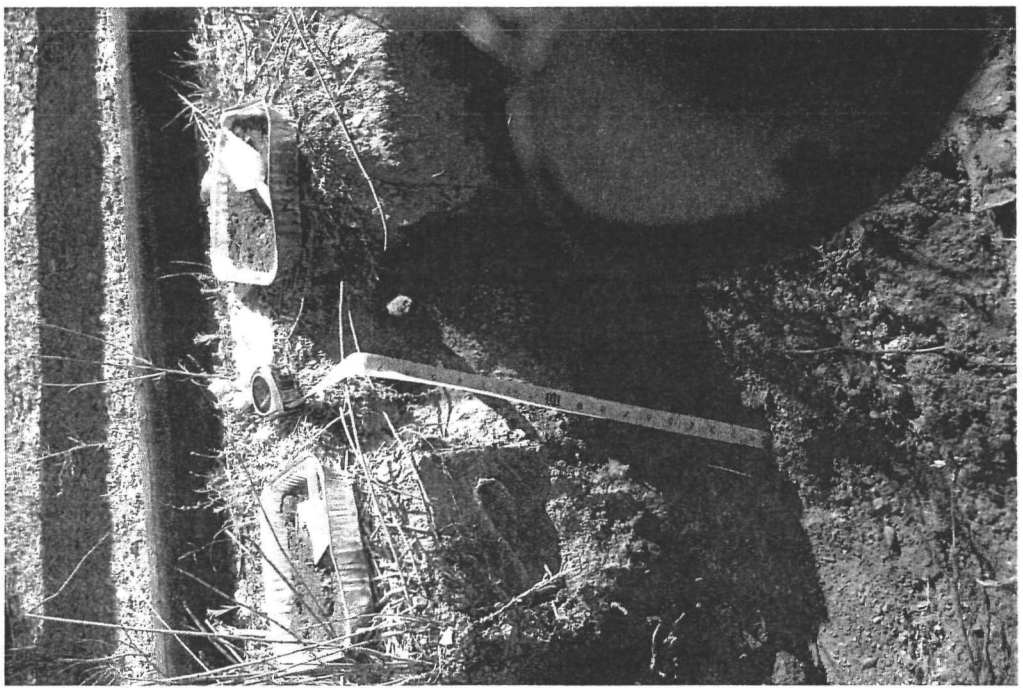
Picture #: West Valley RR Photos/Image088.jpg	Description: Test Pit WVRB-105-B

Picture #: West Valley RR Photos/Image089.jpg	Description: Test Pit WVRB-105-C

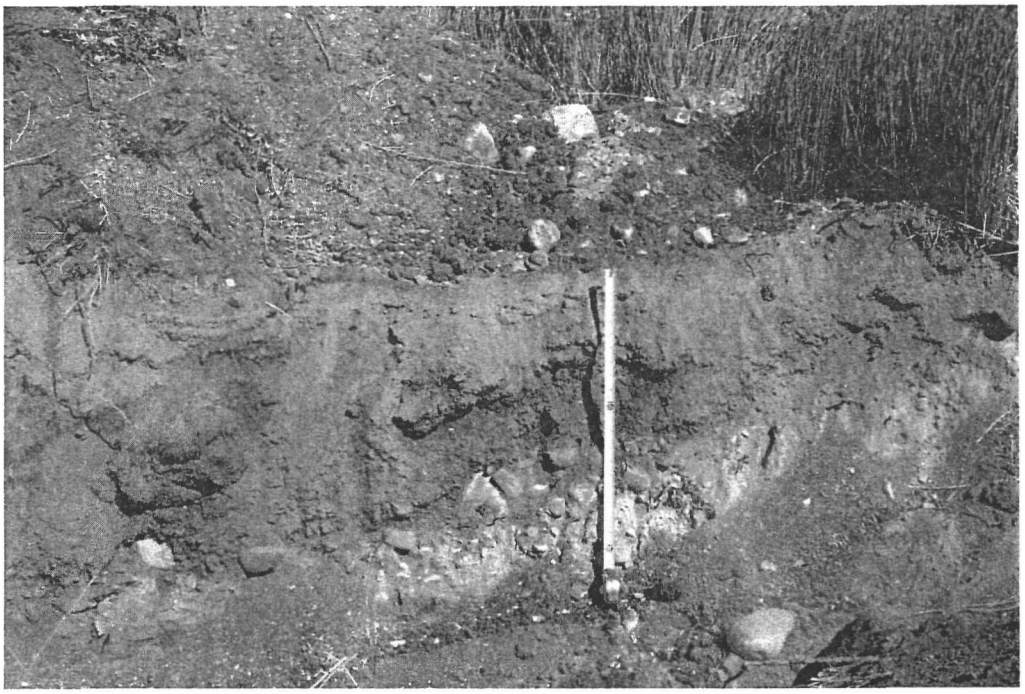


Picture #: West Valley RR Photos/Image090.jpg	Description: Test Pit WVRB-120-A

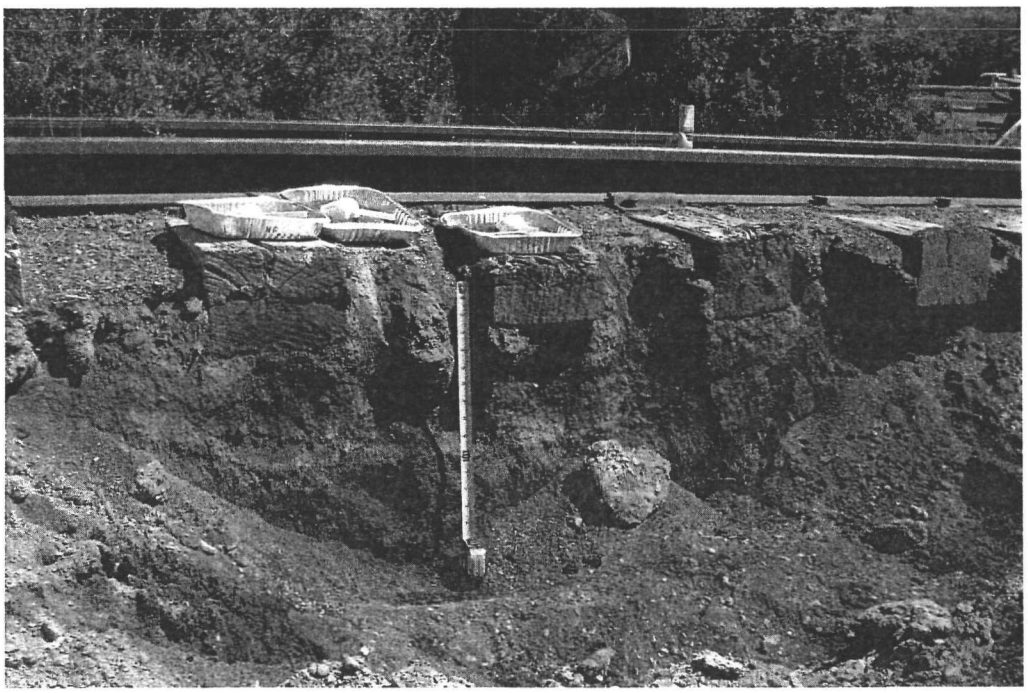
Picture #: West Valley RR Photos/Image091.jpg	Description: Test Pit WVRB-120-B



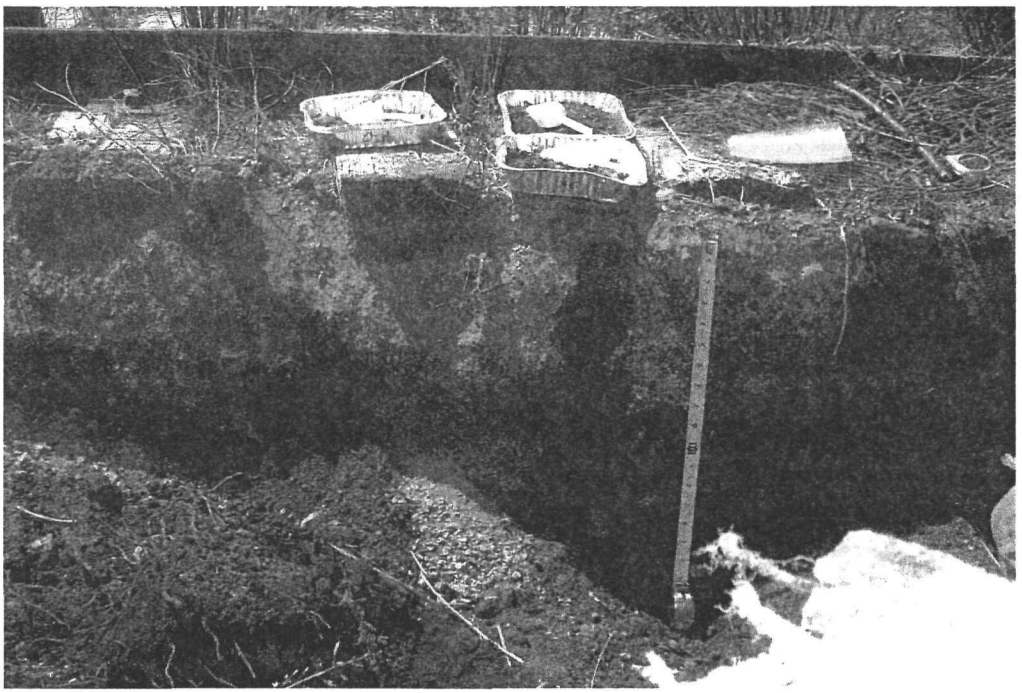
Picture #: West Valley RR Photos/Image092.jpg	Description: Test Pit WVRB-120-C



Picture #: West Valley RR Photos/Image093.jpg	Description: Trench south of Test Pit WVRB-135-A Showing orange sand



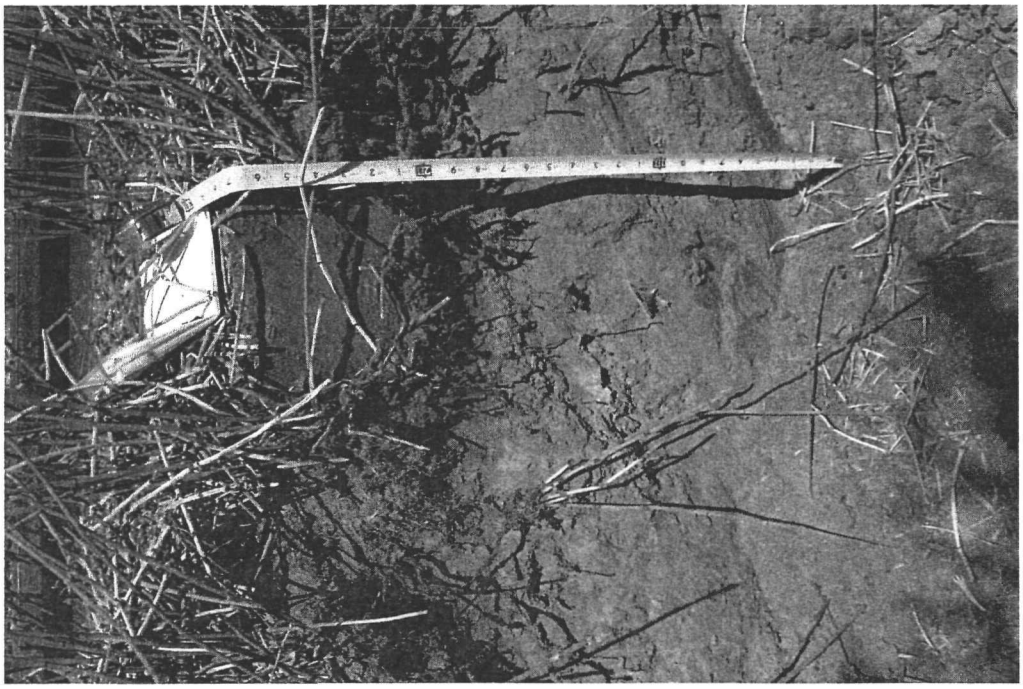
Picture #: West Valley RR Photos/Image094.jpg	Description: Test Pit WVRB-135-B



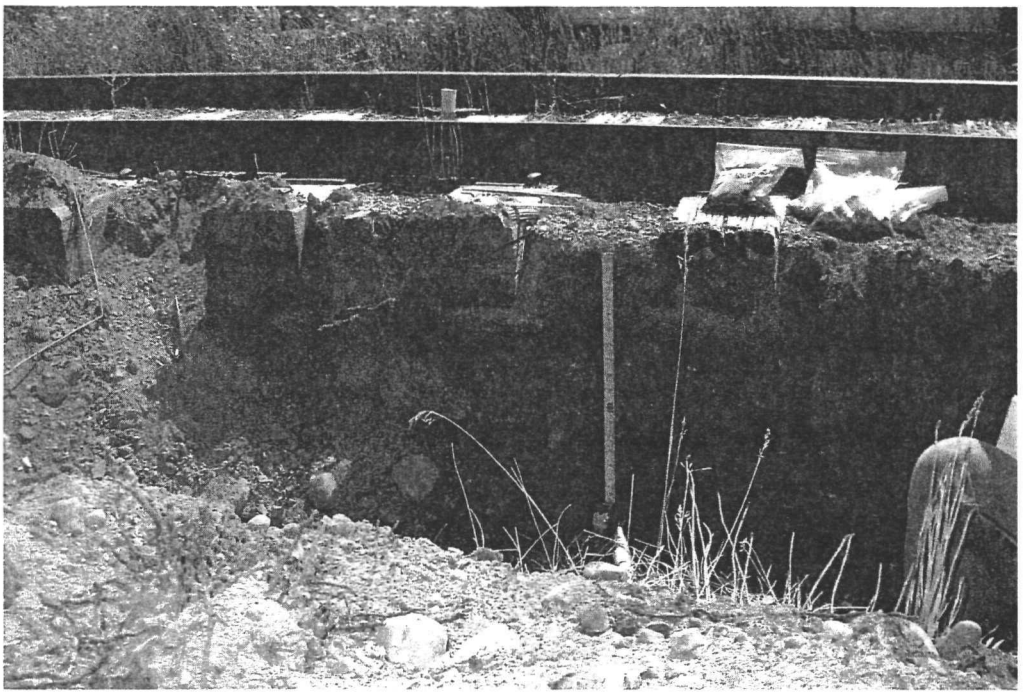
Picture #: West Valley RR Photos/Image095.jpg	Description: Test Pit WVRB-135-C

Picture #: West Valley RR Photos/Image096.jpg	Description: Test Pit WVRB-150-A

Picture #: West Valley RR Photos/Image097.jpg	Description: Test Pit WVRB-150-B

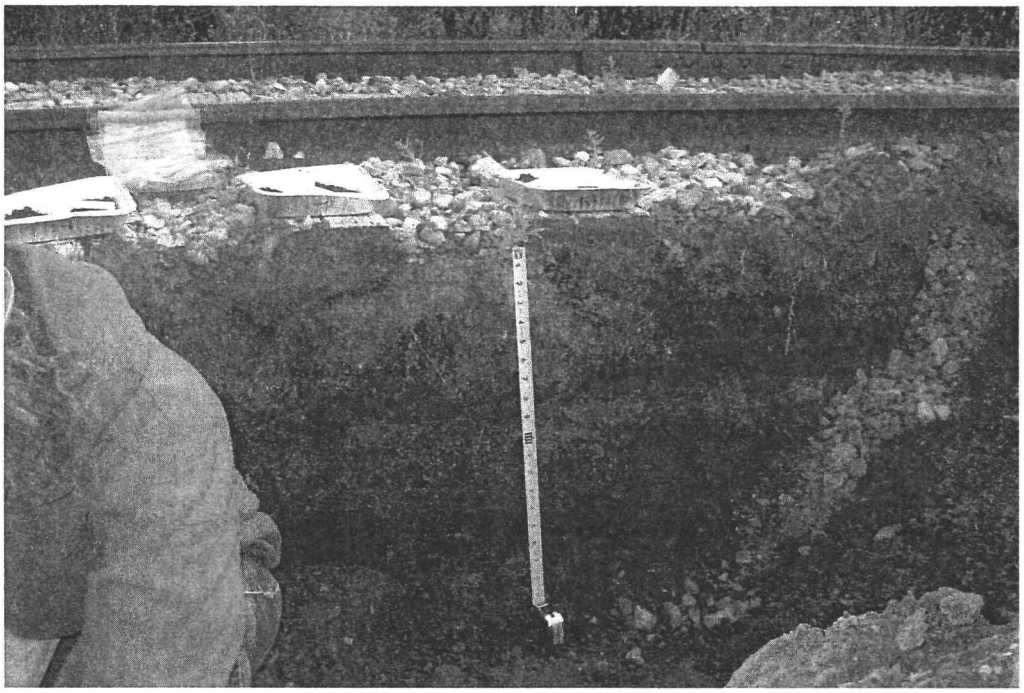


Picture #: West Valley RR Photos/Image098.jpg	Description: Test Pit WVRB-150-C

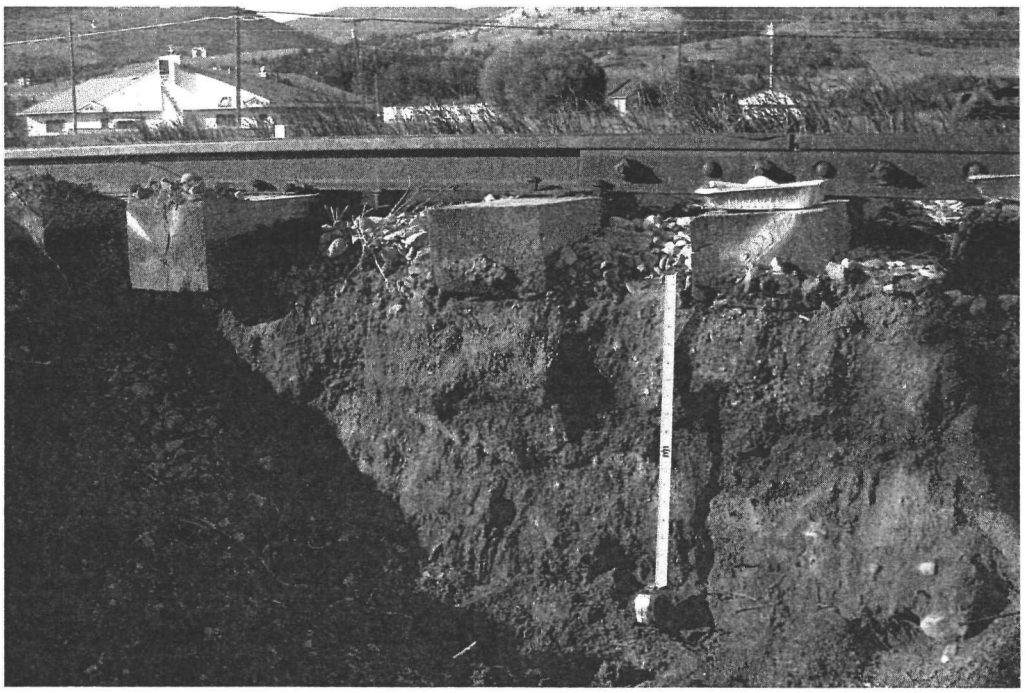


Picture #: West Valley RR Photos/Image099.jpg	Description: Test Pit WVRB-165-A

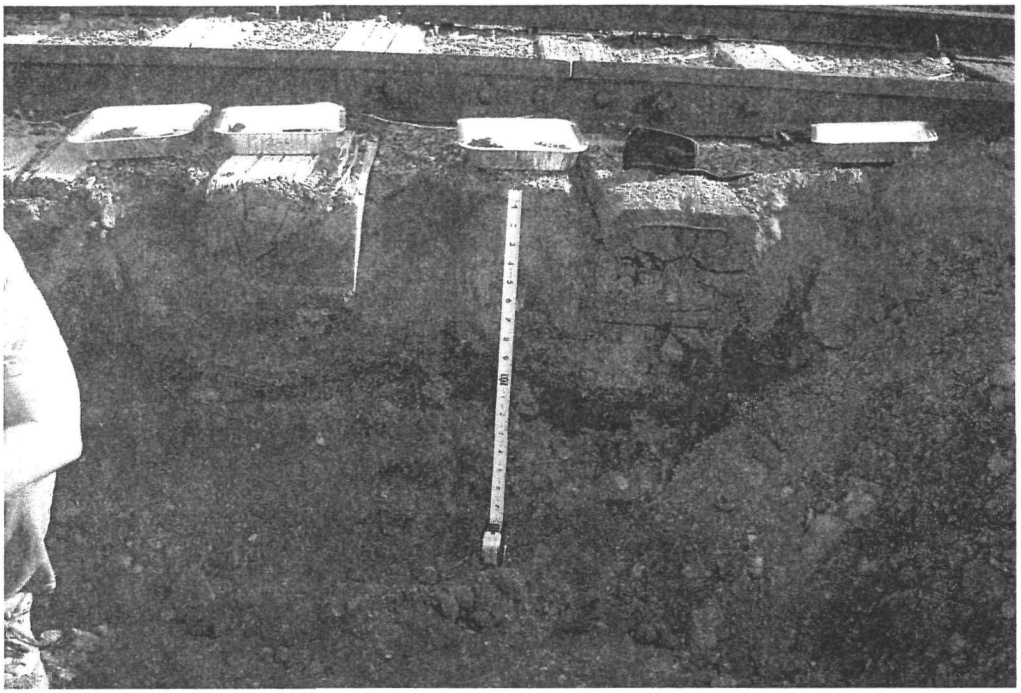
Picture #: West Valley RR Photos/Image100.jpg	Description: Trench west of Test Pit WVRB-165-A, Opportunity Sample WVRB-165-A8
PREPARED FOR: Atlantic Richfield Company, A BP affiliated company	Project: 2003 RDU5 West Valley Railroad Bed Investigation



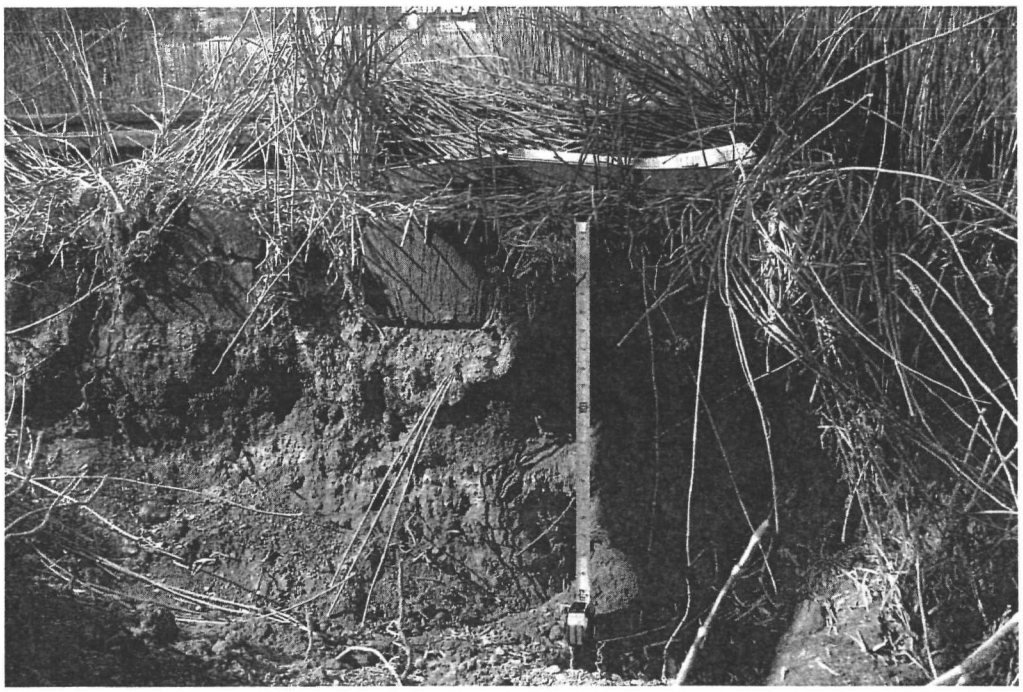
Picture #: West Valley RR Photos/Image001.jpg	Description: Test Pit WVRB-165-B



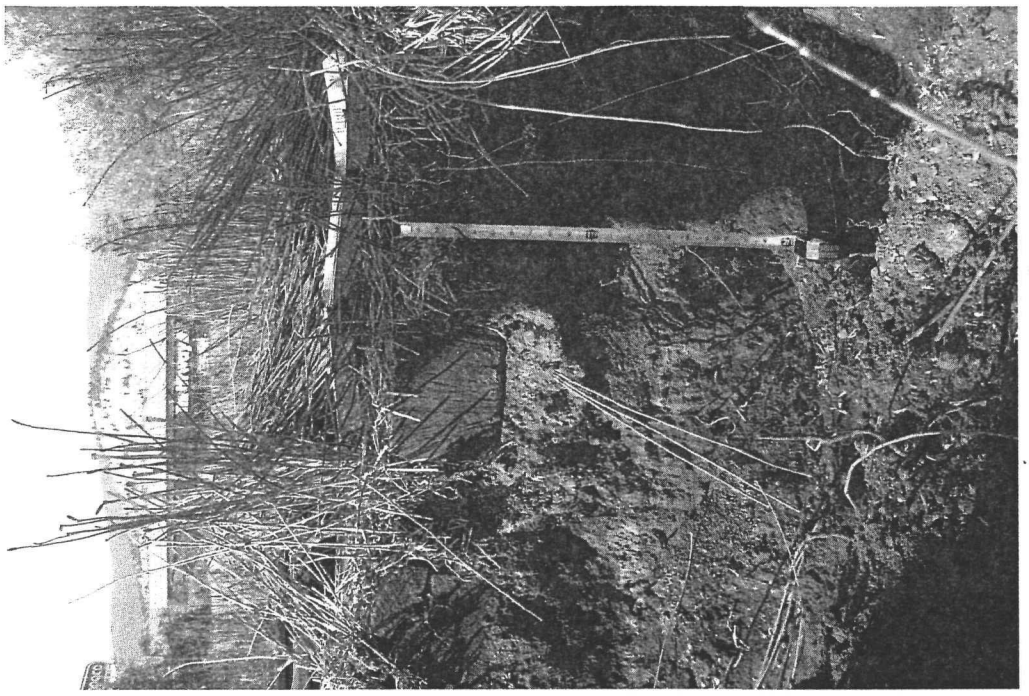
Picture #: West Valley RR Photos/Image002.jpg	Description: Test Pit WVRB-165-C



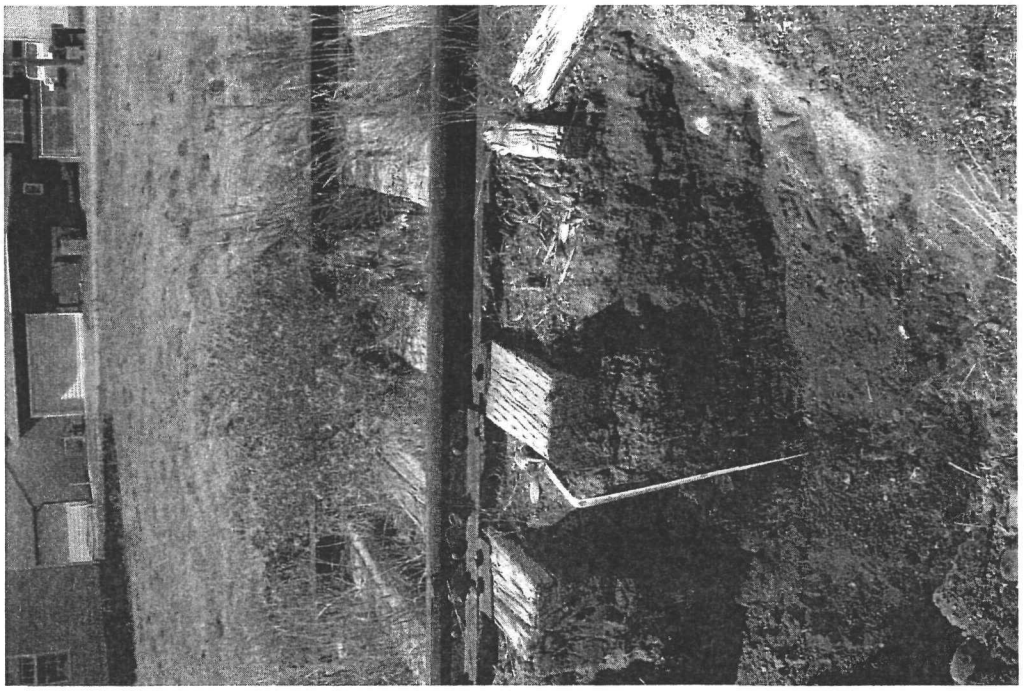
Picture #: West Valley RR Photos/Image003.jpg	Description: Test Pit WVRB-180-A



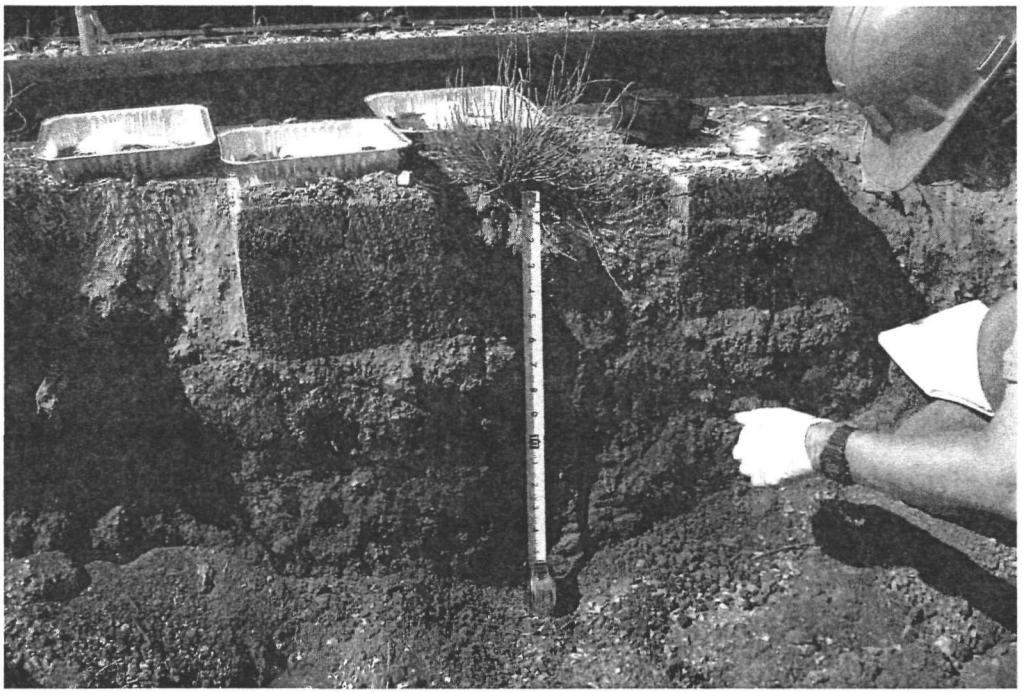
Picture #: West Valley RR Photos/Image004.jpg	Description: Test Pit WVRB-180-B



Picture #: West Valley RR Photos/Image005.jpg	Description: Test Pit WVRB-180-B

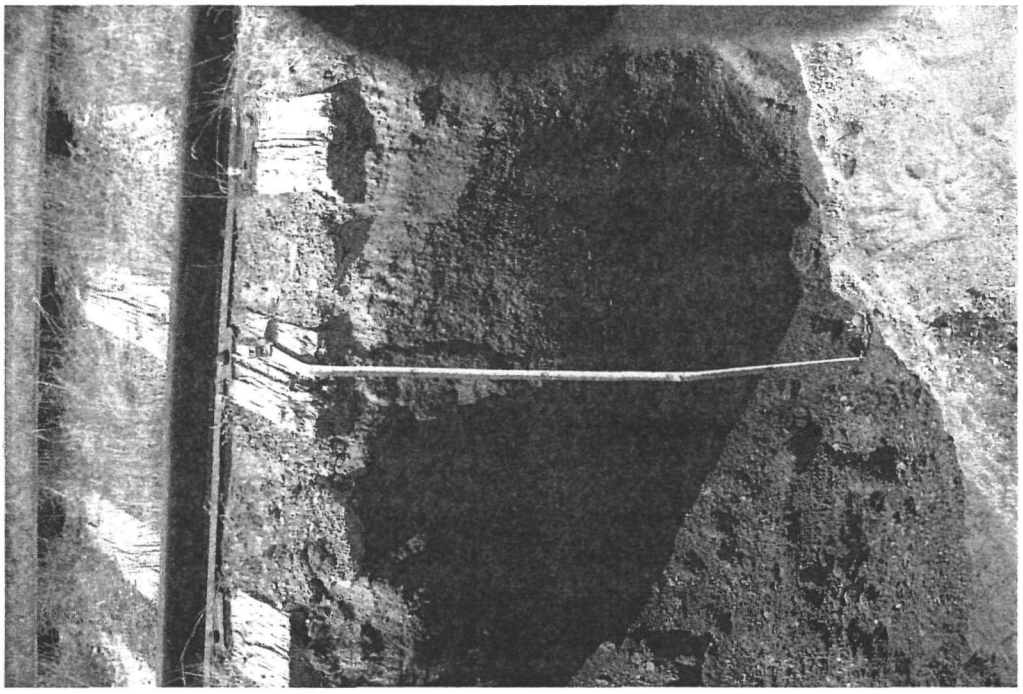


Picture #: West Valley RR Photos/Image006.jpg	Description: Test Pit WVRB-180-C (North side of tracks)



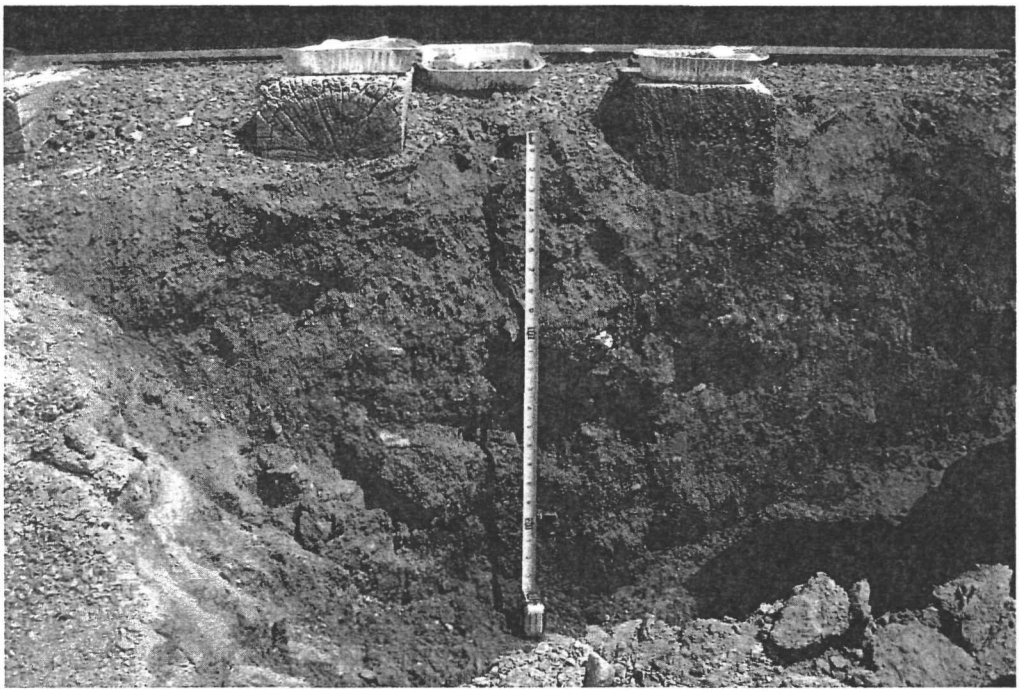
Picture #: West Valley RR Photos/Image007.jpg	Description: Test Pit WVRB-195-A

Picture #: West Valley RR Photos/Image008.jpg	Description: Test Pit WVRB-195-B2



Picture #: West Valley RR Photos/Image009.jpg	Description: Test Pit WVRB-195-B1

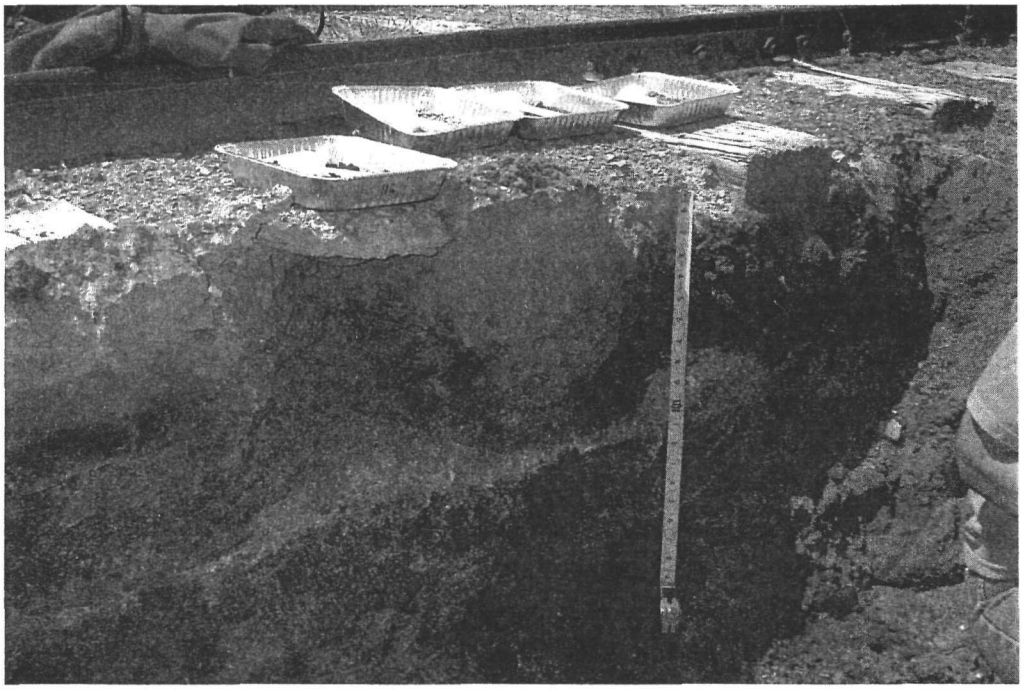
Picture #: West Valley RR Photos/Image010.jpg	Description: Area below Test Pit WVRB-195-B1



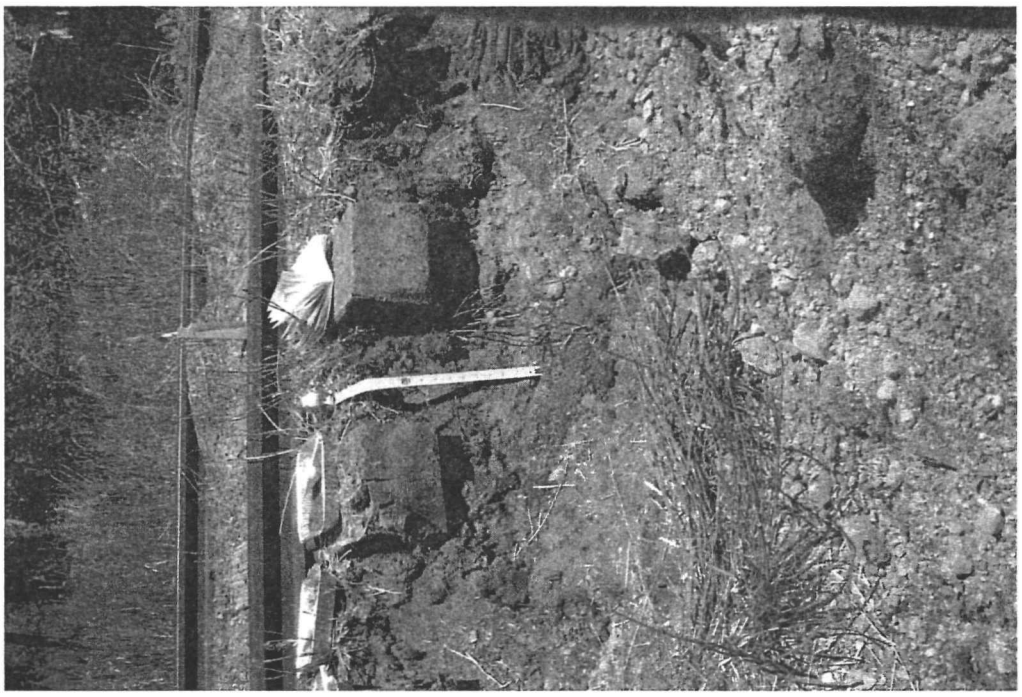
Picture #: West Valley RR Photos/Image011.jpg	Description: Test Pit WVRB-195-C

Picture #: West Valley RR Photos/Image012.jpg	Description: Trench on north side of tracks by Test Pit WVRB-195-C
PREPARED FOR: Atlantic Richfield Company A BP affiliated company	Project: 2003 RDU5 West Valley Railroad Bed Investigation

Picture #: West Valley RR Photos/Image013.jpg	Description: Trench on north side of tracks by Test Pit WVRB-195-C



Picture #: West Valley RR Photos/Image014.jpg	Description: Test Pit WVRB-210-A



Picture #: West Valley RR Photos/Image015.jpg	Description: Trench on north side of tracks by Test Pit WVRB-195-C

Picture #:	Description: